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Birds in the California Desert
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ANNOTATED BIBLIOGRAPHY ON SEASONAL MOVEMENTS
OF MIGRATORY AND RESIDENT BIRDS
IN THE CALIFORNIA DESERT

Contract CA-060-CT7-2661

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An annotated bibliography of the ornithology of the California deserts

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I. INTRODUCTION

Approximately 30 percent of the state of California consists of desert. "Each year across the deserts of the lower Colorado River basin of the southwestern United States and northwestern Mexico move great numbers of migrant birds, passing between their mesic or even humid and cool breeding grounds and the wintering ranges in the mountains or mesic areas of the mainland of Mexico" (Miller, 1963). Migrants wintering in Baja California pass through the area to breeding areas in the Great Basin and beyond. Shorebirds and waterbirds that winter along the Pacific coast of California or Mexico, or at the Salton Sea, cross the area in several directions while returning to inland breeding colonies in the central United States and prairie provinces of Canada. The most extreme of these trans-desert movements requires a flight of 500-700 miles across terrain that is largely unsuitable for the survival of most species (Fig. 1). And in fall, especially, the movements are made all the more rigorous by the hot and dry conditions of that period. How these movements are accomplished, and whether birds rely on any precise routes through the desert, is not known.

In addition, approximately 30 species of birds are characteristic inhabitants of the California desert, residing there year-round, or for at least the breeding season. Other species migrate altitudinally to winter in the desert. For each group, the extent of their movements is known in only the most general terms.

As part of its responsibility to plan for the effective use and management of the California Desert, the Bureau of Land Management, Riverside, California, contracted with Hubbs/Sea World Research Institute, to summarize current knowledge on avian movements in the desert. The major goals of this study were "1) to gather and analyze the existing literature and unpublished data regarding the movements of avian species within and through the California desert; 2) and to design field investigations to fill data gaps and to determine migratory pathways, corridors, key stopping and resting sites."

II. METHODS

Grinnell's monumental "Bibliography of California Ornithology" (1909, 1924, 1939) was the major source of information for materials published

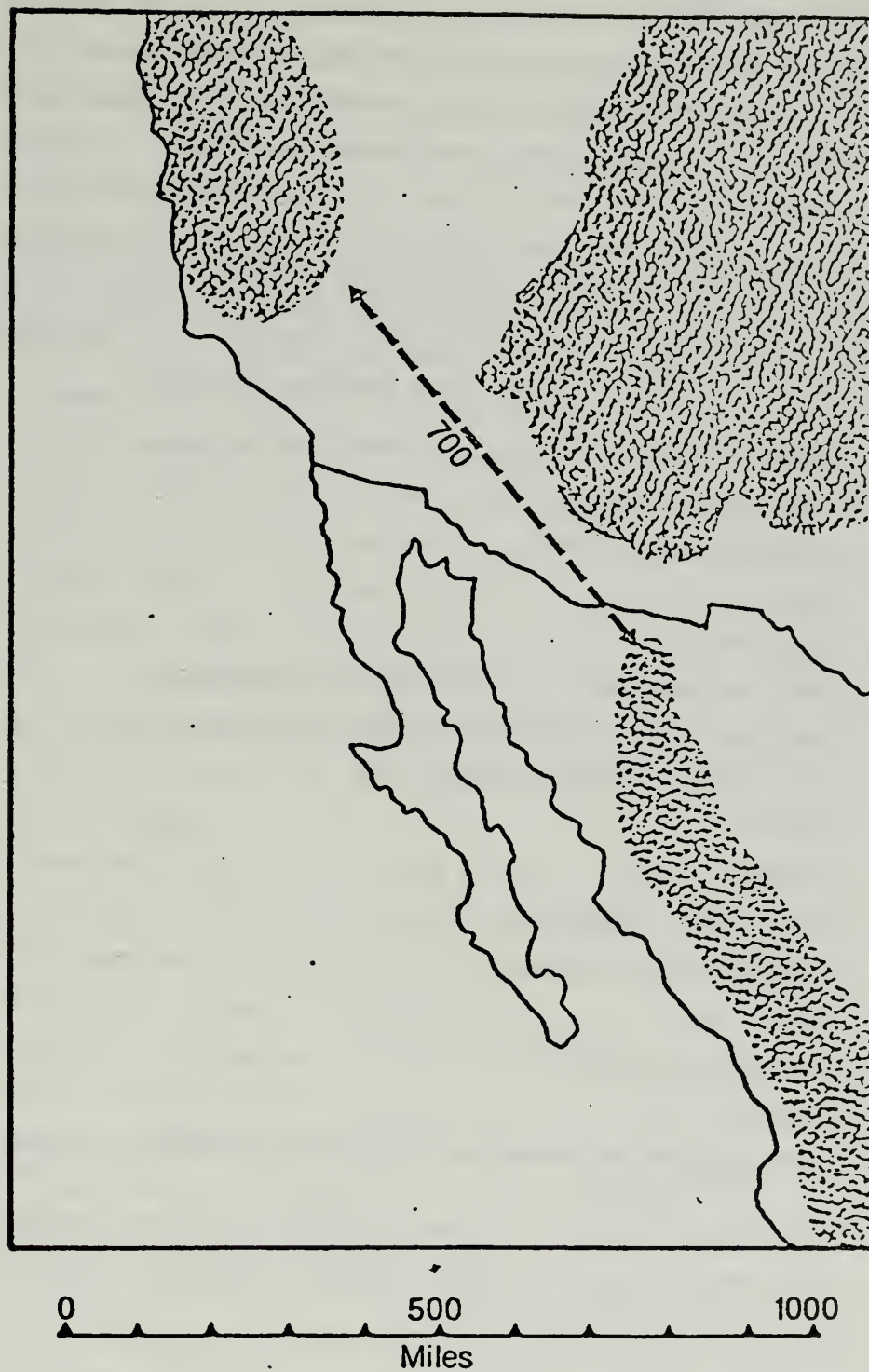


Figure 1. The southwestern United States and northwestern Mexico, showing the extent of desert regions that must be crossed by migratory land birds progressing between mesic area habitats (stippled).

between 1797 and 1938. Index cards were prepared for all papers that might pertain to the movements of resident and migratory birds in the desert areas. Subsequently these publications were examined and the cards annotated. Cards for irrelevant or insignificant works were discarded. In the few cases when we were unable to locate the original reference, we relied on Grinnell's annotations in considering the applicability and/or reliability of a paper. We made no attempt to include citations of papers of mere historical interest.

Since 1939 most of the relevant published material has appeared in relatively few journals. These were searched by hand:

- American Birds (formerly Audubon Field Notes)
- American Midland Naturalist
- American Naturalist
- Auk
- Bird-Banding
- California Academy of Sciences, Proceedings
- California Academy of Sciences, Occasional Papers
- California Fish and Game
- Condor
- Ecology
- Ecological Monographs
- Environment Southwest
- Evolution
- Great Basin Naturalist
- Living Bird
- Los Angeles County Museum of Natural History, Contributions in Science
- Los Angeles County Museum of Natural History, Quarterly
- Los Angeles County Museum of Natural History, Bulletin
- Ornithological Monographs
- Pacific Coast Avifauna
- San Diego Society of Natural History, Occasional Papers
- San Diego Society of Natural History, Memoirs
- San Diego Society of Natural History, Transactions

Southern California Academy of Sciences, Bulletin
 University of California Publications in Zoology
 United States National Museum, Proceedings
 United States National Museum, Bulletin
 Western Birds (formerly California Birds)
 Wilson Bulletin

In addition, we surveyed the in-house publications of major eastern museums (e.g., American Museum Novitates), although most of the material relevant to this study dated from early in the century and was covered by Grinnell. Inasmuch as the distribution and migrations of desert birds are dictated by their adaptations for tolerating extreme environments, we consulted the major physiological journals for salient articles. We have cited such articles on desert birds, even though the original research was not done in the California deserts, believing that the results are broadly applicable. The Zoological Record was used as appropriate. We did not use a computer search: 1) because the utility of such searches for materials of this type has yet to be demonstrated; and 2) because of the broad nature of the subject, we felt that important materials might be missed by keyword indices, and thus be overlooked.

Comprehensive regional works were among the most important sources of information. Critical references include: American Ornithologists Union Checklist of North American Birds (5th ed.); Grinnell, Distributional summation of the ornithology of Lower California; Small, The birds of California; Phillips, Marshall, and Monson, The birds of Arizona; Grinnell and Miller, The distribution of the birds of California; Miller and Stebbins, Lives of desert animals in Joshua Tree National Monument; Friedmann, Griscom and Moore (Pt. 1) and Miller, Friedmann, Griscom, and Moore (Pt. 2), Distributional check-list of the birds of Mexico.

Other salient information can be inferred from taxonomic studies of polytypic species (e.g., Phillips, 1975), or from detailed studies of museum collections. Data on museum holdings provided by the BLM extend only to the species, not subspecies level, and consequently have limited utility in this context. Other important data on bird movements, are contained in a series of reports by the U. S. Fish and Wildlife Service and the California

Department of Fish and Game. Additional unanalyzed data, emphasizing waterfowl and other game species, are in the files of the Bird-Banding Laboratory, Patuxent, Maryland. We made no effort to obtain such data. As the Bird-Banding office does not have sufficient staff to deal with the accumulated information, we did not think we would do much better.

In the annotated bibliography (Part II), *published* materials are subdivided into two groups: those dealing specifically or mainly with the California deserts; and those dealing largely with adjacent areas, but which are relevant to understanding avian movements distribution in California.

To determine the location of *unpublished* materials we relied heavily on personal contact with prominent field ornithologists. In addition, we contacted curators of major research collections in California regarding the availability of field notes or other important materials in their care. Such materials (or their absence) is noted in the bibliography under the name of the institution. The Desert Plan staff of the Bureau of Land Management, Riverside, California provided much unpublished data, including environmental surveys, distributional studies, breeding bird censuses, raptor reports, and holdings of museum specimens from desert areas. BLM staff also assisted in searching for unpublished materials in the files of the Museum of Vertebrate Zoology, University of California, Berkeley.

To facilitate the analysis of vast amounts of data, we subdivided the desert into nine major regions, and one subregion (Fig. 2), after consultation with the BLM staff. These included:

Area 1. Northern Mountains: mountain ranges north of the San Bernardino County line including the Panamints, Argus, Coso, Amargosa, Grapevine, Funeral, Greenwater and the eastern edge of the Inyos.

Area 2. Northern Valleys: lowland areas of above region, including Death Valley National Monument, Panamint Valley, Greenwater Valley, Saline Valley, and Eureka Valley.

Area 3. West Mojave, including parts of southeastern Kern Co., northeastern Los Angeles Co., and southwestern San Bernardino Co. The eastern divide follows north along I-15 to just west of Barstow and then due north to the Inyo-San Bernardino county line just east of Trona. Includes Antelope and Freemont valleys, China Lake.

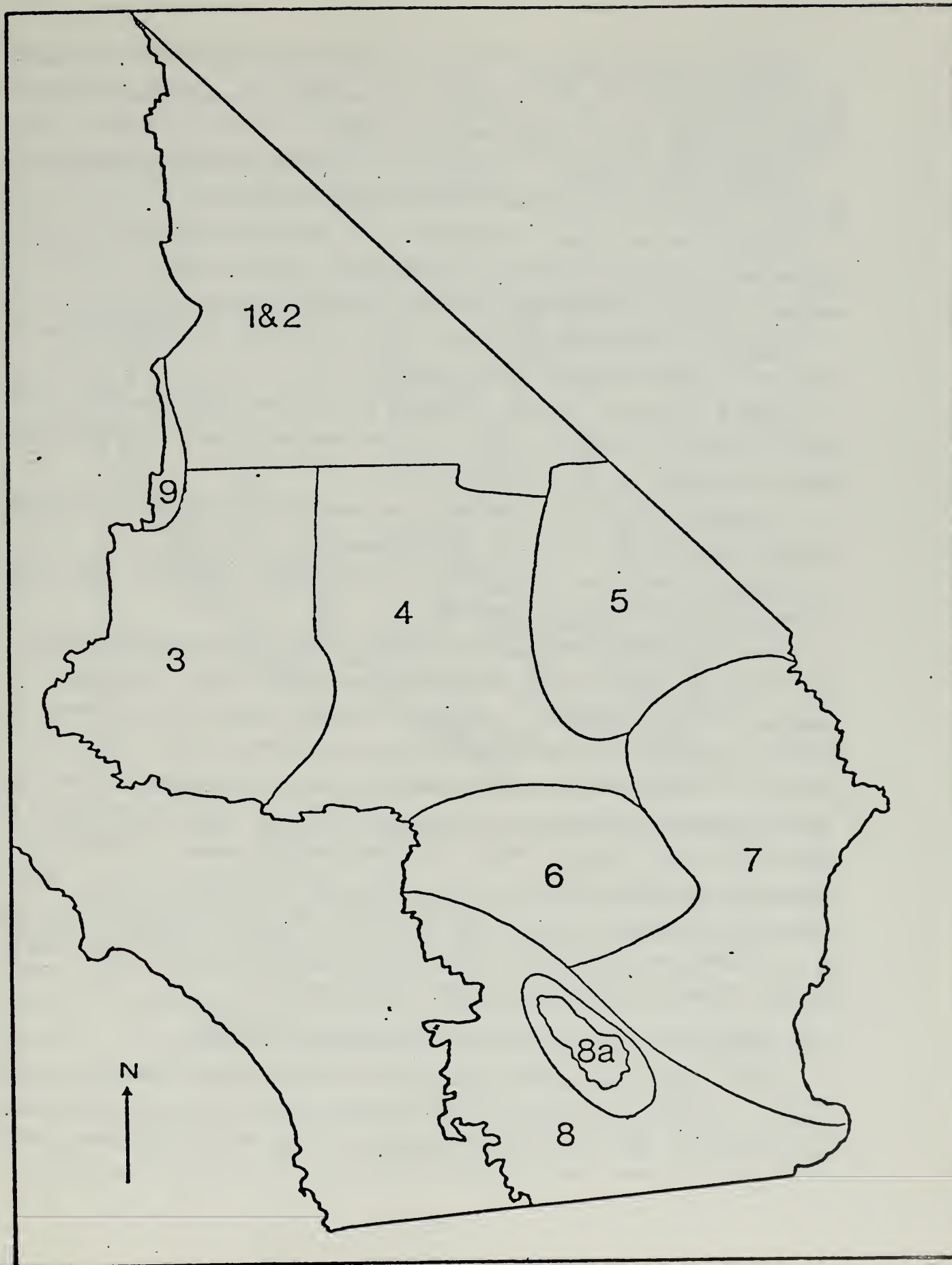


Figure 2. The nine areas of California Desert recognized in this study: 1) Northern Mountains, 2) Northern Valleys, 3) West Mojave, 4) Central Mojave, 5) East Mojave, 6) Joshua Tree, 7) Colorado Desert, 8) Imperial Valley, 8a) Salton Sea, 9) East face of Sierras.

Area 4. Central Mojave: from the Inyo-San Bernardino Co. line south to the area directly north of Joshua Tree National Monument, east to include Bristol Dry Lake and north and west past Baker.

Area 5. East Mojave: the region south of the San Bernardino Co. line to Route 66 and east from Baker to the Nevada state line.

Area 6. Joshua Tree: including all of the National Monument, Little San Bernardino Mts., Eagle Mts., Coxcomb Mts., Sheep Hole Mts. with the southern edge following along I-10 east to Desert Center.

Area 7. Colorado Desert: area south of Route 66 to the Chocolate Mts., east to the Colorado River area.

Area 8. Imperial Valley: the area west of the Chocolate Mts., northwest to Desert Hot Springs, south along the western edge of the Anza Borrego Desert State Park to the Mexican boundary.

Area 8a. Salton Sea: the region adjacent to the sea north to Thermal and south to Niland, Calipatria and Westmorland.

Area 9. East Face of the Sierra Nevada: from the Walker Pass north to Inco and east to Highway 395.

Data (published and unpublished) were compiled onto seasonal check lists (Spring: March - May; Summer: June - August; Fall: September - November; Winter: December - February) for each area, and areas where extensive field work had been accomplished were plotted on maps (Part V). Seasonal lists, plotted by major areas, provide a rapid means of checking for the presence or absence of species, and thus of indicating possible migration route. However, these lists are insufficient for determining much about the prominence of routes. For such inferences, we have relied on our own experience in the deserts, as well as on the published literature.

If data were sufficient, check lists were made for individual localities. These are presented by area in the Appendices.

III. ROUTES OF MIGRATION AS POSTULATED IN THE LITERATURE

Cooke (1925) summarized broad patterns of migration through the United States. His data were repeated and extended by Lincoln (1935, and subsequent publications). Most of Lincoln's comments on the "Pacific Coast Route" are

concerned with waterfowl movements in the northwest and are not relevant to the present report. In general, he considered that "the southward route of those migratory birds of the Pacific coast that in winter leave the United States extends chiefly through the interior of California to the mouth of the Colorado River and on to winter quarters in western Mexico" (Fig. 3).



Figure 3. Major migration routes in the United States redrawn from Cooke (1925; Fig. 2).

A few authors have discussed possible migration routes across the southwest deserts. Among the earliest was A. Brazier Howell (1923), who speculated on routes along the Gila River into Arizona, along the riparian growth of the Colorado River through southern California, and on "highland routes". In California, he considered that the shores of the Salton Sea basin provided "leading lines" for migrants funnelling birds northward to the Coachella Valley, which he considered "an important highway". Indeed, "the probabilities are that it is decidedly the most important, concentrated route across the California deserts. More birds may pass over the central

desert section, but in that area there is apparently no inducement for concentration" (Fig. 4).

Howell's ideas seem to be widely supported. Small (1975: 234-5) wrote: "Of the five California deserts, the Colorado Desert figures most importantly in the spring migratory patterns of small land birds into California from Mexico. Lying as it does in the natural valley of the Salton Trough, the Colorado Desert receives most of the land bird migrants from Mexico that are funneled into it by the surrounding mountains. To the east, those migrants following the valley and riparian woodlands along the Colorado River tend to remain in that attractive habitat for as long as possible. They therefore follow the river northward for some distance before once more crossing the inhospitable open Mojave Desert."

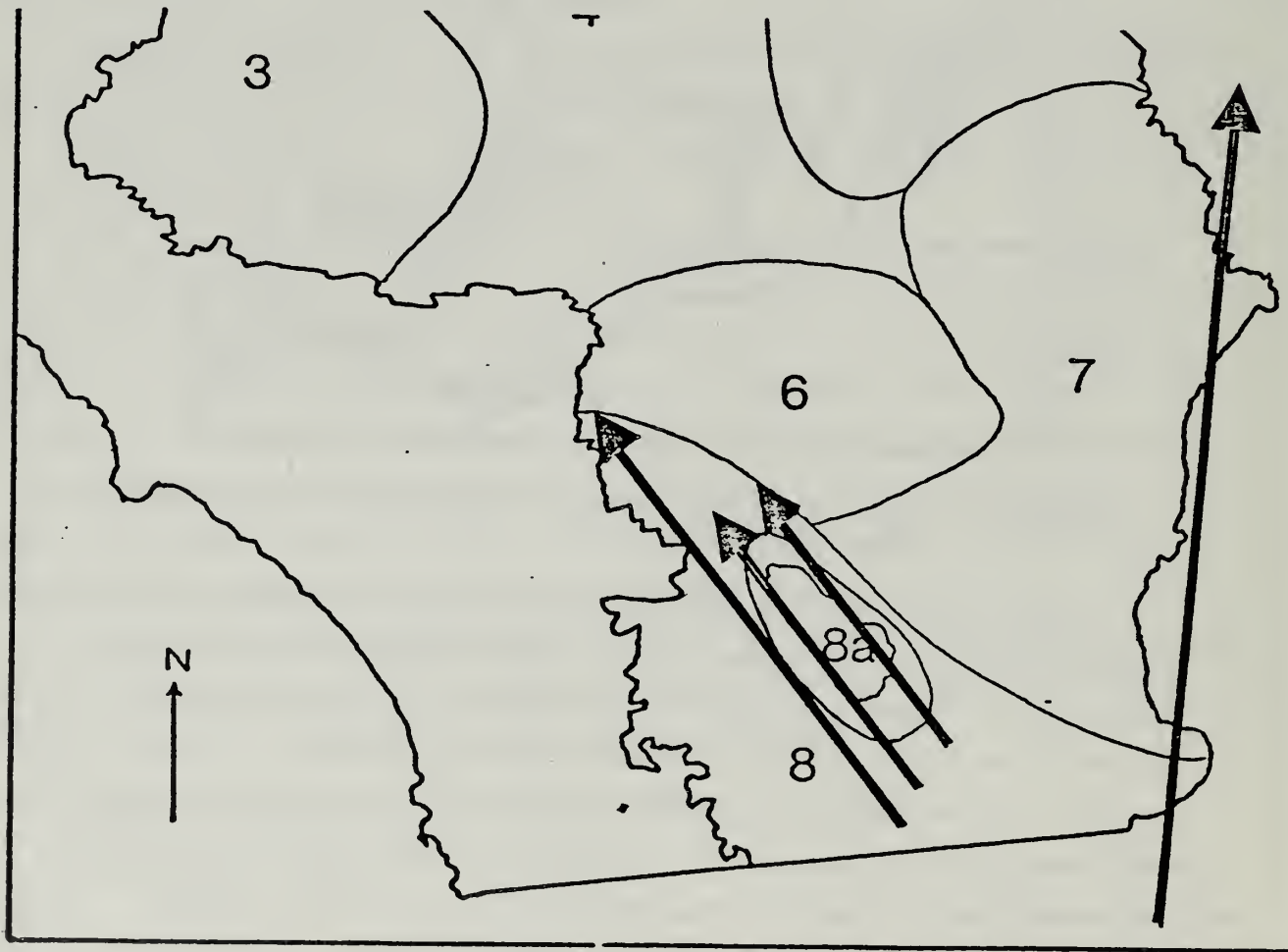


Figure 4. Major migratory routes through the California deserts as envisioned by Howell (1923).

In his review of "Avian flyways of Western America," L. H. Miller (1957) emphasized the effects of topography, particularly fault lines and mountain passes, in influencing migration. He, too, considered the route from the Gulf of California, through Coachella Valley and San Geronio Pass to be the major route of birds crossing the desert. North of San Geronio, birds were reported moving through Cajon Pass to Antelope Valley. Mill Creek Canyon, the Garlock Fault, and Arroyo Seco seem to be major east-west routes through the mountains (Fig. 5).

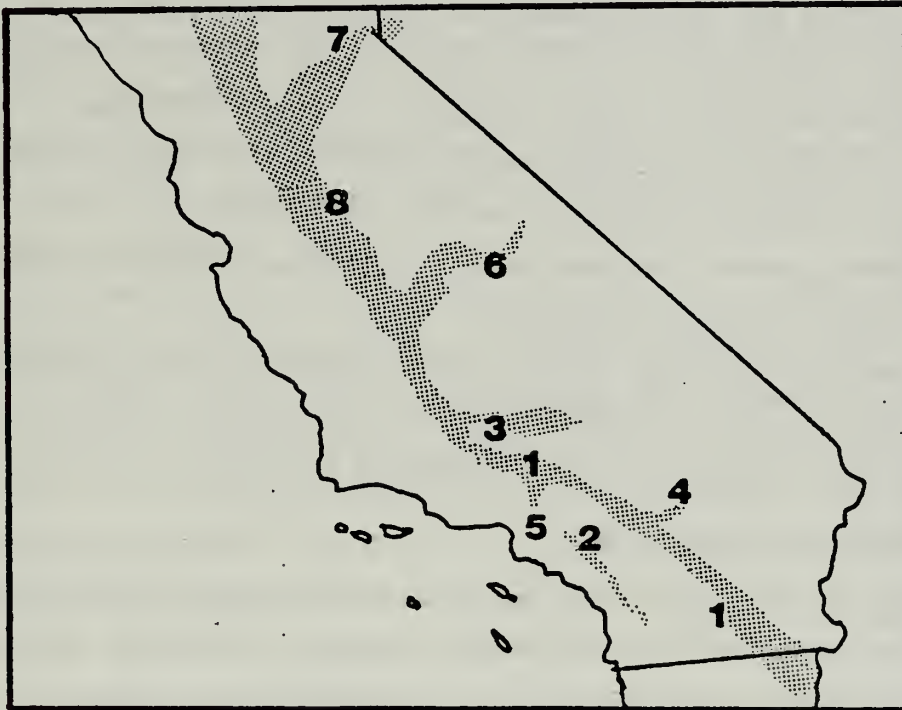


Figure 5. Flight lines through the southern California, after L. Miller (1975; Fig. 1). 1) The southern part of the San Andreas Fault, Gulf of California to Central Valley; 2) Elsinore Fault; 3) Garlock Fault; 4) Mill Creek Canyon; 5) Arroyo Seco; 6) Kearsarge Pass; 7) Echo Summit; 8) Great Central Valley.

The concept of a "desert flight line" has recently been advanced by Pulich and Phillips (1953) to account for the distribution of American Redstarts in the southwest. Basically, they suggested that individuals from western Redstart populations follow a distinct route that takes them "through"

the main deserts of the Southwest" and particularly along the Colorado River. The nature and location of this "route" was never precisely stated. Nevertheless, other authors have accepted the idea (e.g., Miller, 1963; Small, 1954; Austin, 1971; Binford, 1971) and extended it to other species (e.g., Black-and-white Warbler, Northern Waterthrush). However, McCaskie (1970c) argued that if such a "desert flight line" actually exists, it must include the entirety of southeastern California, as distributional records for most species alleged to use this route are more widespread than earlier authors had thought.

McCaskie (1970a) has demonstrated that vagrant seabirds (mostly Pelecaniformes) arrive at the Salton Sea via the Gulf of California in summer. Those progressing farther north are usually shunted through the Coachella Valley and San Geronio Pass; other vagrant seabirds may follow the Colorado River, sometimes as far as Nevada (see also Dunn and Unitt, 1977).

It has been suggested that some landbirds follow ridges southward (Miller and Stebbins, 1964); evidence is scanty.

With the exception of the Turkey Vulture (Watkins, MS), detailed below, we have found no published information dealing with possible routes of migration or dispersal among resident or breeding species.

IV. GENERAL ASPECTS OF MIGRATION

Timing of Migration. The major movements of birds through California are seasonal, corresponding to the spring/fall patterns typical of migrations elsewhere in the Northern Hemisphere. Yet, some birds may be moving at almost any season. Northward migration for Allen's Hummingbird begins in late December, when some species are still moving southward. Spring migration gradually builds to a peak with major flights of shorebirds in April-May; and the passage of passerines continuing into early June. By late June the first shorebirds have returned from the breeding grounds, and post-breeding northward movements of some species can be observed. The peak of fall migration occurs from late August - October. However, movements of waterfowl and open-country birds may extend until much later in the year, partly in response to weather conditions farther north. And in some years mountain-dwelling species show altitudinal migrations, which bring them to the edge of (or into) the desert.

General migration patterns in California and associated meteorological conditions have been summarized by Small (1975: 14-17). Details of migration periods for individual species may be found in standard works. Miller and Stebbins (1964) present detailed data for Joshua Tree National Monument, which are broadly applicable.

Volume of migration: Use of oases.

The volume of non-passerine (mainly waterbird) migration across the desert probably varies little in the spring and fall periods, except that the fall numbers are probably greater, since they are augmented by young that have recently been added to the population. Water birds are adapted for long, non-stop migrations, are unaffected by ground conditions along the route, and presumably follow the same general routes each season. They may land to rest and feed wherever aquatic habitats become available. However, the presence of spring pools, etc. is unpredictable and it would seem a poor strategy to depend on them.

All authors apparently agree that there are profound differences in the volume of landbird movements, with spring migrants far outnumbering those in fall. Small (1975: 235), for example, noted that the agricultural areas of the Imperial and Coachella valleys often "swarm with migrants" in spring.

There are few quantitative data to substantiate this conclusion. Data from museum specimens (BLM files) or field notes (this study) are strongly biased by the preponderance of spring field work. Nevertheless, the conclusion is logical. As many authors have pointed out (e.g., Miller and Stebbins, 1964) environmental conditions in spring are tolerable for a wide variety of landbirds; surface water is usually available; vegetation is in bloom; and insects are relatively abundant. In fall, however, temperatures are extreme, water is scarce, and conditions may exceed the physiological capabilities of many species (see Miller and Stebbins, 1964, for mortality of migrants during a heat wave). In theory, fall migrants should adjust their routes to avoid desert routes entirely, or to overfly the desert without stopping. Such flights are easily within the capabilities of many species (Odum et al., 1961). Some evidence for seasonal differences in routes (and abundance) is available (e.g., Phillips, 1964; Johnson, 1965, 1970, 1973); see also Watkins (MS, and below, for data on Turkey Vultures.

Although many migrants congregate in oases during the day, we have no evidence that they cross the desert by moving from oasis to oasis. Such a strategy would be energetically wasteful, as the distribution of oases bears no relationship to the expected directions of movement. Evidently total use of oases is greater in spring than in fall. On the other hand, access to water and to sheltered areas may be most critical in fall, when environmental conditions are most severe.

Smyth and Coulombe (1971; Table 1) studied patterns of spring utilization, finding that peak use occurred between 0900 and 1300, with a smaller peak late in the day (see also Cowan, 1952). If this pattern is general, it has implications for wildlife management. They also studied drinking habits of desert species. Many were not seen to drink at all, which suggests that their ranges and distribution may not be tied to water availability. Interestingly, the Black-throated Sparrow, which can survive on a dry diet, drank regularly when water was available.

Habitat changes and migration. Although migration routes persist over long periods of time, minor route shifts can develop rapidly in response to changing local conditions. As long ago as 1923, A. B. Howell commented that vegetational changes in the Anza-Borrego desert, as a result of agriculture,

Table 1. Drinking habits of desert birds. From Smyth and Coulombe, 1971.

TABLE 1. A summary of the drinking habits of the commoner birds resident around Upper Carrizo Spring in the summer.

Species	Food ^a
Not seen drinking	
Ladder-backed Woodpecker (<i>Dendrocopos scalaris</i>)	I
Ash-throated Flycatcher (<i>Myiarchus cinerascens</i>)	I
Verdin (<i>Auriparus flaviceps</i>)	I
Bewick Wren (<i>Thryomanes bewickii</i>)	I
Cactus Wren (<i>Campylorhynchus brunnicapillum</i>)	I
Cañon Wren (<i>Catherpes mexicanus</i>)	I
Rock Wren (<i>Salpinctes obsoletus</i>)	I
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	I, C
Scott Oriole (<i>Icterus parisorum</i>)	F, I

Seen drinking

Roadrunner (<i>Geococcyx californianus</i>)	I, C
Poor-will (<i>Phalaenoptilus nuttallii</i>) ^b	I
Lesser Nighthawk (<i>Chordeiles acutipennis</i>) ^b	I
Say Phoebe (<i>Sayornis saya</i>)	I
Mockingbird (<i>Mimus polyglottus</i>) ^b	I, F
Phainopepla (<i>Phainopepla nitens</i>) ^b	F, I
Gray Vireo (<i>Vireo vicinior</i>) ^b	I
Drinks regularly	
Gambel Quail (<i>Lophortyx gambelii</i>)	G, I
Mourning Dove (<i>Zenaidura macroura</i>)	G
White-winged Dove (<i>Zenaida asiatica</i>)	G
House Finch (<i>Carpodacus mexicanus</i>) ^c	G, F
Black-throated Sparrow (<i>Amphispiza bilineata</i>)	G, I

^a C = carnivorous, F = fructivorous, G = granivorous, I = insectivorous. Taken from Miller and Stebbins (1964).

^b This species, though resident around Upper Carrizo Spring, was seen to drink only at Cottonwood Spring.

^c Resident in spring and early summer, but later moved away from the vicinity.

were creating new habitats for migrants as well as residents, and, in addition, were providing pathways for the dispersal of desert vertebrates.

Much of the California desert has remained virtually unchanged through historical times, at least in broad view. The major exception is the Coachella Valley - Imperial Valley - Salton Sea area, where the creation of an inland sea in 1906 immediately changed the ecology of a large area. The new habitats were occupied by migrating waterfowl and ducks that previously passed overhead enroute to the Gulf of California and beyond. The importance of this change is best illustrated by the fact that today a National Wildlife Refuge exists at the southern end of the Sea. The subsequent development of agriculture created landbird habitats that attract large numbers of birds.¹ Major changes of a different type have taken place in the Antelope Valley.

We have insufficient data to determine the extent to which local habitat changes may have affected bird movements. It is clear, however, that some habitats, such as the saguaro forest near Bard, where Huey did much field work, no longer exist.

Habitat changes beyond the desert limits (e.g., the destruction of sagebrush in the Great Basin; Braun et al., 1976) may be relevant: the reduction of breeding populations can lead to shifts in status that are unappreciated and could be interpreted as shifts in migration patterns.

¹ "Great changes rendered in the Imperial Valley over the past few years... wave action has inundated or eroded away all but one remnant of the sandy nesting islands which formerly supported colonies of Gull-billed Terns, Laughing Gulls, White Pelicans and the like...it is a virtual certainty that the only known nesting colony...of Laughing Gulls is no longer extant. White-faced Ibis probably no longer nest on the delta of the New River and almost no Sandhill Cranes winter in the valley today. Numbers of Fulvous Whistling-ducks were reduced from many hundreds breeding to but a few dozens, due in part to the clearing of much of the marsh at Ramer Lake...few Vermillion Flycatchers are to be found in the Valley...White Pelicans were not known to nest there in 1959, while the colonies of Great Blue Herons and Snowy Egrets were small. Wood Storks formerly appeared at the south end of the Salton Sea by the hundreds in late summer, but today only a few venture to remain (or even arrive at all!). Owing to the drowning and clearing of the large cottonwoods the Harris' Hawk (formerly a summer resident in small nos. has not been seen in the Imperial Valley for almost 7 years. Clearing of the Screwbean Mesquite and the Atriplex...has eliminated cover and habitat for a number of indigenous spp...For the Mourning Doves, however, all of this has been fortuitous, as literally swarms...can be seen everywhere...Ground Doves have prospered...hundreds of thousands of Red-winged and Yellow-headed Blackbirds, and now even a good number of Starlings have found conditions favorable and swarm around the cattlepens...development of homesites in the Coachella Valley has had the same effect." Small, Amer. Birds, 14: 340, 1960.

V. DISTRIBUTIONAL DATA AND MAPS

In this section we synthesize distributional data from each of the geographic areas within the desert, based on published and unpublished information. The data are presented in checklist format to permit rapid comparison between areas and seasons. In addition, we have included a master list, summarizing seasonal occurrences in each area (Appendix I). We have also prepared maps for each area (Appendix II), showing areas where significant amounts of work have been accomplished; the type of work is indicated. Breeding bird censuses, winter bird population studies, and Christmas Bird Censuses are mapped separately. After examining these data we concluded that a more detailed analysis (e.g., by month) would be largely uninformative, in view of the crudeness of most data.

Much of the original data on which the checklist and maps are based are included in the Supporting Material (Part V). When feasible, we prepared summary checklists for individual localities within each area (Appendix III), and from these developed a list of "key stopping places" for migrating landbirds (Table 2).

Comments on distributional data

AREA 1. There are fairly good data for summer birds in the northern mountains, but data for other seasons are sparse; and there is no information from winter. Wauer's (1964) summary of birdlife in the Panamint Mts. is the major source of information from this area. No quantitative studies have been conducted.

AREA 2. There are extensive data for several localities in Death Valley for spring and fall. Summer studies are few and concentrated at the end of the spring and beginning of fall migration periods. Winter data are not exhaustive, but Christmas Bird Counts have been conducted regularly at Furnace Creek Ranch. Wauer (1962) summarized birdlife in Death Valley. New information since obtained pertains largely to rarities.

AREA 3. Fairly detailed field data at all seasons from a few localities, including Butterbread Spring (Kelso Valley) and China Lake area. There are quantitative data from three breeding bird surveys and one CBC (Butterbread Spring).

AREA 4. Data are mostly from the vicinity of Barstow, Daggett (Lamb, 1912), near Hesperia (two Winter Bird Population Studies) and Afton Canyon

(breeding bird surveys). Most data pertain to spring migration period, and at this season the only locality with more than one source of information is Afton Canyon.

AREA 5. Remsen (MS) provided a thorough survey of this area. It is relatively well known and Breeding Bird Surveys and Winter Bird Population studies have been conducted there. Considerable work in the mountain areas was done by Johnson, Bryant, and Miller (1948).

AREA 6. Birdlife of Joshua Tree National Monument was treated by Miller and Stebbins (1964) on the basis of detailed and long-term study. Several CBC's and one Winter Bird Population Study (1974) were also conducted there. Outside of the Monument, the only extensive data are from Morongo Valley in spring. Three Christmas Bird Counts (1960-1962) have also been conducted there. Data in Miller and Stebbins seem applicable to entire area.

AREA 7. The area is not well known and most data derive from the southern portion, through the Sun Desert Project. Very few data for winter. There have been no quantitative studies published.

AREAS 8 and 8A. Extensive data for all seasons from the Salton Sea vicinity (McCaskie, field notes, several Christmas Bird Counts). The status of waterbirds there has also been reviewed (McCaskie, 1970). Some information is available for other localities at all seasons, including the Winter Bird Population Studies. More data from the Coachella Valley would be useful, however, in view of the alleged importance of this locality to migrants.

AREA 9. There are virtually no data for any season. Six 1977 breeding bird surveys and a few museum specimens from Walker Pass comprise the entirety of the data.

Adequacy of the data

Long-continued Christmas Bird Counts provide good data for broad comparisons of annual changes in bird distribution and, more importantly, for comparing patterns between areas. The best data are from Salton Sea (south and north) Joshua Tree Nat'l. Monument, China Lake, and Death Valley.

Winter Bird Population Studies in the desert are recent (1973-74, 1976-77) and to date none have been replicated. Similarly only four Breeding Bird Censuses have been published, though an additional 25 were conducted

TABLE 2.

Key stopping or resting areas for birds in the California desert.*

- Area 1: None known
- Area 2: Oasis, Deep Springs, Scotty's Castle, Mesquite Springs, Furnace Creek Ranch, Indian Ranch, Saratoga Springs (Before the Park Service cut down the trees), Amargosa Gorge
- Area 3: Harper Dry Lake Marsh, Butterbread Spring
- Area 4: Afton Canyon, Barstow, Daggett
- Area 5: Clark Mt., Kelso, Fort Piute, Baker
- Area 6: Morongo Valley, 29 Palms, Cottonwood Springs, Joshua Tree Nat'l. Monument (see Miller and Stebbins, 1964)
- Area 7: Desert Center
- Area 8: Imperial and Coachella Valleys, Salton Sea, Dos Palmas Springs, 1000 Palms Oasis, Borrego Springs, Brock Ranch, Algodones Dunes (thickets on east side)
- Area 9: Grapevine Canyon, Sand Canyon

* These areas are known to be used regularly by migrating landbirds. Their importance is roughly proportional to their size. The Salton Sea is the only one of importance to migrating waterbirds.

Areas which contain suitable habitat and may be important for migrants, but have not been studied, include: agricultural area in Antelope Valley, Mojave River (Area 3), Mojave River (Area 4), Yucca Valley (Area 6), and Corn Springs (Area 7).

Unstudied areas which may be important to resident species include riparian habitat along Mojave River (Areas 3 and 4), for Yellow-billed Cuckoo, Elf Owl, Wied's Crested Flycatcher, Willow Flycatcher, Vermillion Flycatcher, Bell's Vireo, Lucy's Warbler, Yellow Warbler, Yellow-breasted Chat, and Summer Tanager; Joshua Tree Woodland near Cima (Area 5) for Gilded Flicker, Swainson's Hawk, Bendire's Thrasher, and Scott's Oriole.

in 1977 (BLM staff and associates). Winter bird studies to be conducted in these areas (and perhaps others) in the winter of 1977-78 will provide an excellent baseline for future studies. To date, however, only plots at Fort Piute and Piute Wash have been studied in both winter and breeding bird censuses.

No Christmas Bird Counts have been taken in the same areas as breeding or winter bird surveys; in any event the types of data and the area samples are not comparable. Christmas Count data are more similar to the extensive daily checklists of some field workers, and strongly complement such data. The most thorough are for the Salton Sea and Furnace Creek Ranch.

VI. ANNOTATED LIST OF AVIAN TAXA

In this section we summarize specific data pertaining to the migration or movements of desert birds. In a few cases (waterbirds, eastern vagrants), data for many species are combined. Miller and Stebbins' (1964) discussion on migration patterns through Joshua Tree National Monument, on a family as well as a species basis, is the best single source of information on this subject.

LOONS. Large numbers of Arctic Loons move northward in the Gulf of California in spring. Yet there are only a handful of records for the California deserts. Huey (1927) reported birds flying westward from San Felipe, Baja California, over the shortest but highest route to the Pacific (Fig. 6).

The Common Loon is the commonest loon in the deserts, but there are too few records for analysis. The lack of records for Areas 1, 5, and 9 probably reflect the lack of suitable bodies of water or sufficient observations.

GREBES. The absence of grebes in Areas 1 and 9, and the sparseness of records in Areas 5 and 6, seem attributable to lack of suitable habitat. Of the three species that occur regularly, only the Eared is common (it breeds at Oasis), and vast numbers (ca. 200,000) winter on the Salton Sea. This species occurs most frequently in fall, and birds must pass over the desert to reach the Sea, but no patterns can be determined. Nevertheless, long, non-stop movements seem to pose no problem for most grebes, although they, like other waterbirds, may be forced down by bad weather. Moore (pers. comm.) reported that Eared Grebes are grounded each year in the China Lake area, and that one grounding, during a fog, involved over 20 birds.

Records for the Western and Pied-billed Grebe are inadequate for analysis.

ALBATROSSES, SHEARWATERS, STORM-PETRELS. With one exception (Dunn and Unitt, 1977) all records of tube-noses in the deserts are from the Salton Sea. Birds trapped in the Gulf, or driven inland by tropical storms cross overland to the sea from the head of the Gulf of California. Presumably most do not survive to continue on. In any event, these movements are irregular, accidental, and of no significance to the present study.

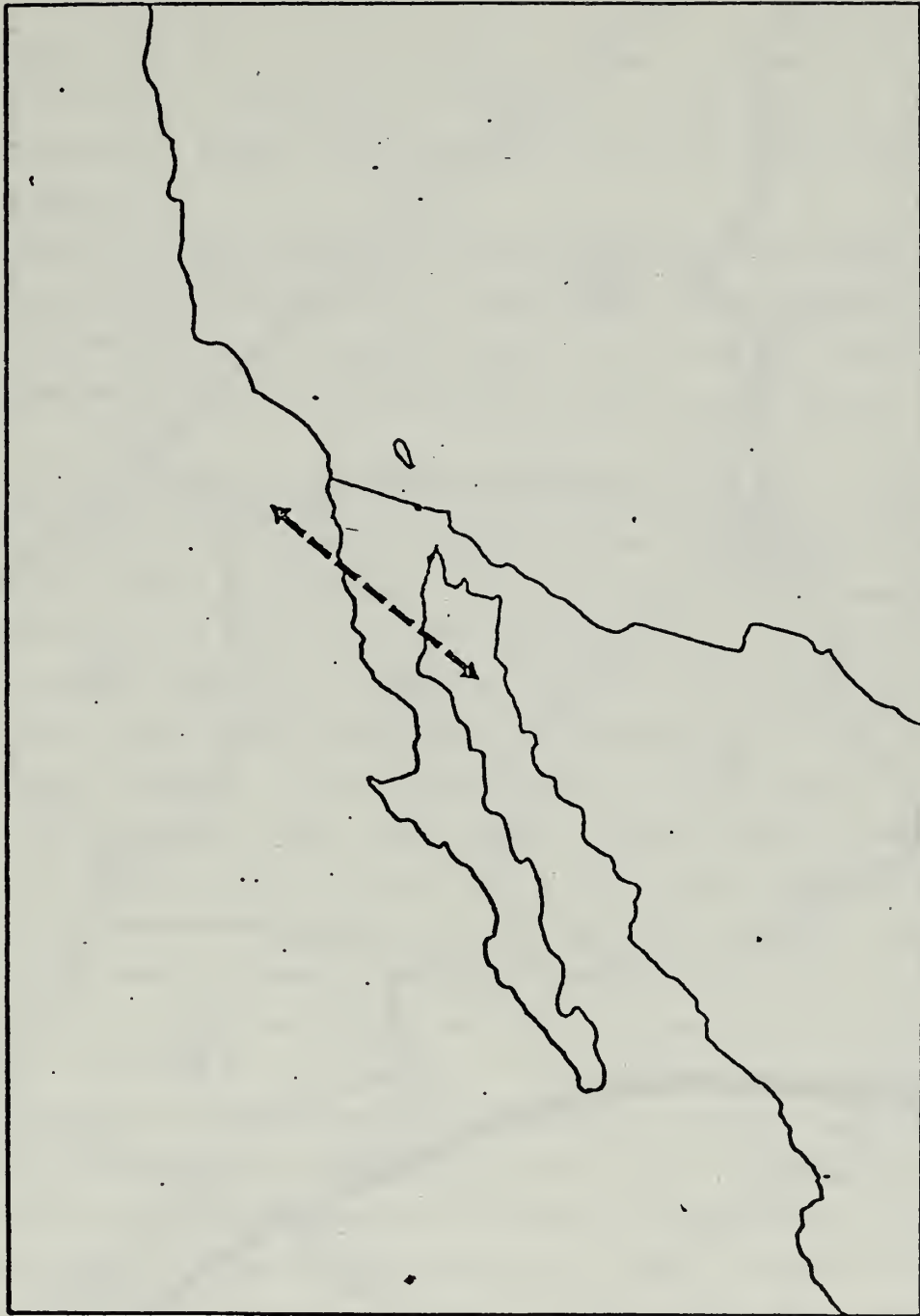


Figure 6. Postulated migration route of Arctic Loon in spring from Gulf of California to Pacific coast (Huey, 1927). A similar route may be taken by Surfbirds.

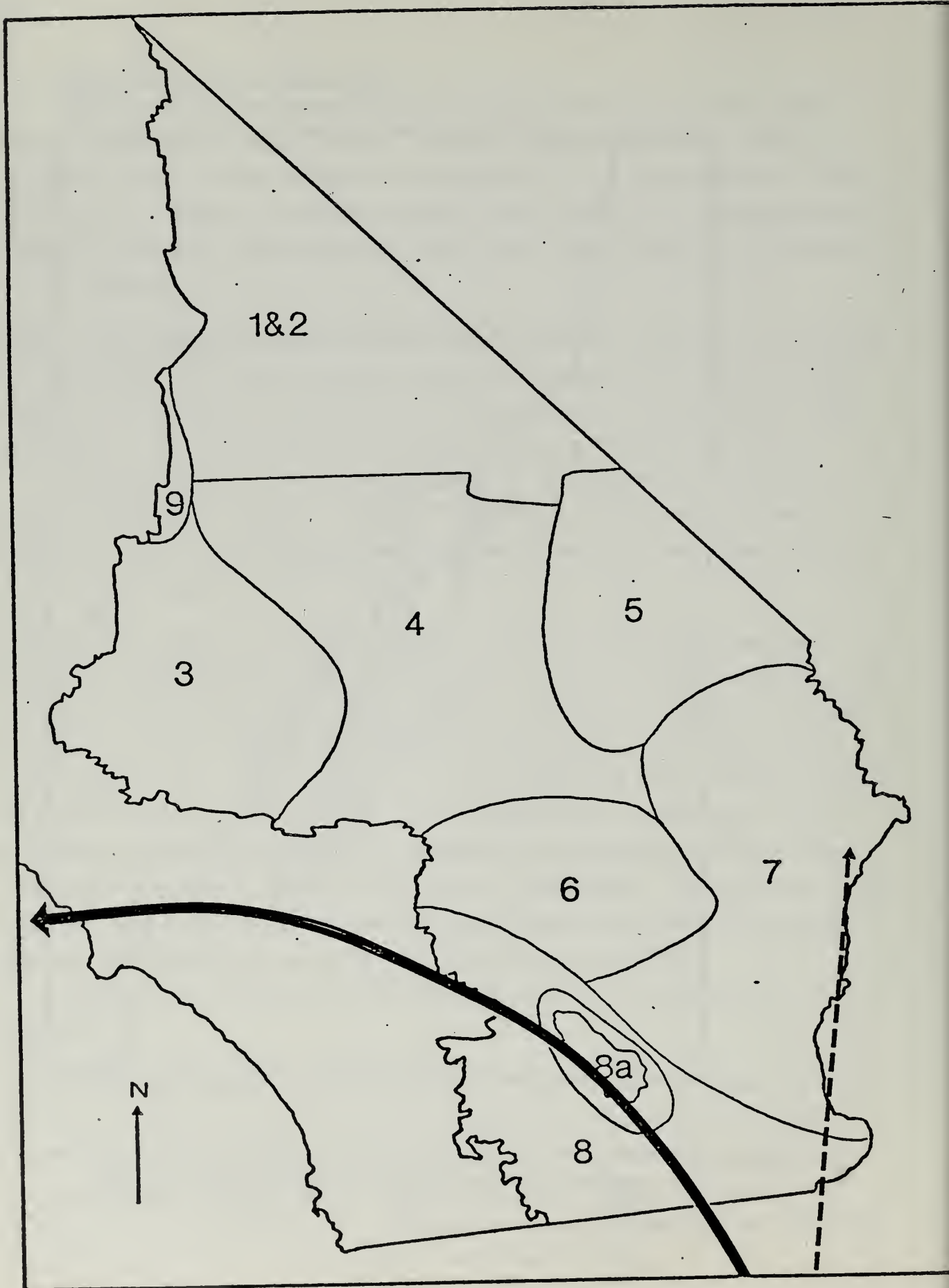


Figure 7. A post-breeding movement of pelicaniform birds from Gulf of California to Pacific coast (main route). A few birds move northward along the Colorado River.

PELICANS, BOOBIES, FRIGATEBIRDS. The distribution of these species in the southwestern United States has been reviewed (McCaskie, 1970e). Brown Pelicans, Brown Boobies, Blue-footed Boobies, and Magnificent Frigatebirds occur in late summer as a result of post-breeding dispersal from the Gulf of California. Virtually all records are of immatures. None occur in large numbers; pelicans rarely exceed 100 individuals at a time; and the boobies do not occur annually.

The occurrence of these species is almost exclusively restricted to the Salton Sea. The few other records are for the Imperial and Coachella valleys, reflecting the Gulf of California origin of the birds and the funnelling effect of the Coachella Valley and San Geronio Pass (Dunn and Unitt, 1977) (Fig. 7).

Double-crested Cormorants are common year-round at the Salton Sea. They are rare elsewhere in the desert and have not been reported in Areas 1, 5, 6, 8 and 9, where their occurrence is precluded by the lack of adequate water. Interestingly, the species is more commonly recorded in fall than in other seasons, perhaps indicating an overland migration towards the west coast or Salton Sea from inland (Great Basin ?) colonies.

White Pelicans nested at the Salton Sea early in this century, disappearing in 1932 (Thompson, 1933), then reappearing and nesting sporadically in the late 1950's (Liem and Behle, 1966). The colony numbered about 50 pairs in 1930. These birds breed in inland lakes and flocks can sometimes be seen flying high over the desert, they are regular in the China Lake area spring and fall. There are spring records for Areas 3, 4, 7, and 8a, and fall records for Areas 2, 3, 4 and 8a. Interestingly, the numbers that winter or pass through the Salton Sea area seem roughly proportional to the numbers breeding in northeastern California (Clear Lake), southern Oregon (Lower Klamath National Wildlife Refuge) and western Nevada (Pyramid Lake). A few birds may occur on large temporary bodies of water in migration (Unitt, pers. comm.). On the other hand, L. Miller (1957) reported regular spring movement from the coast, through Arroyo Seco in the San Gabriels, to the Mojave Desert (Fig. 8).

The only desert record of tropicbird, a species found in the Gulf of California, is from Morongo Valley (American Birds, 1977). The bird was

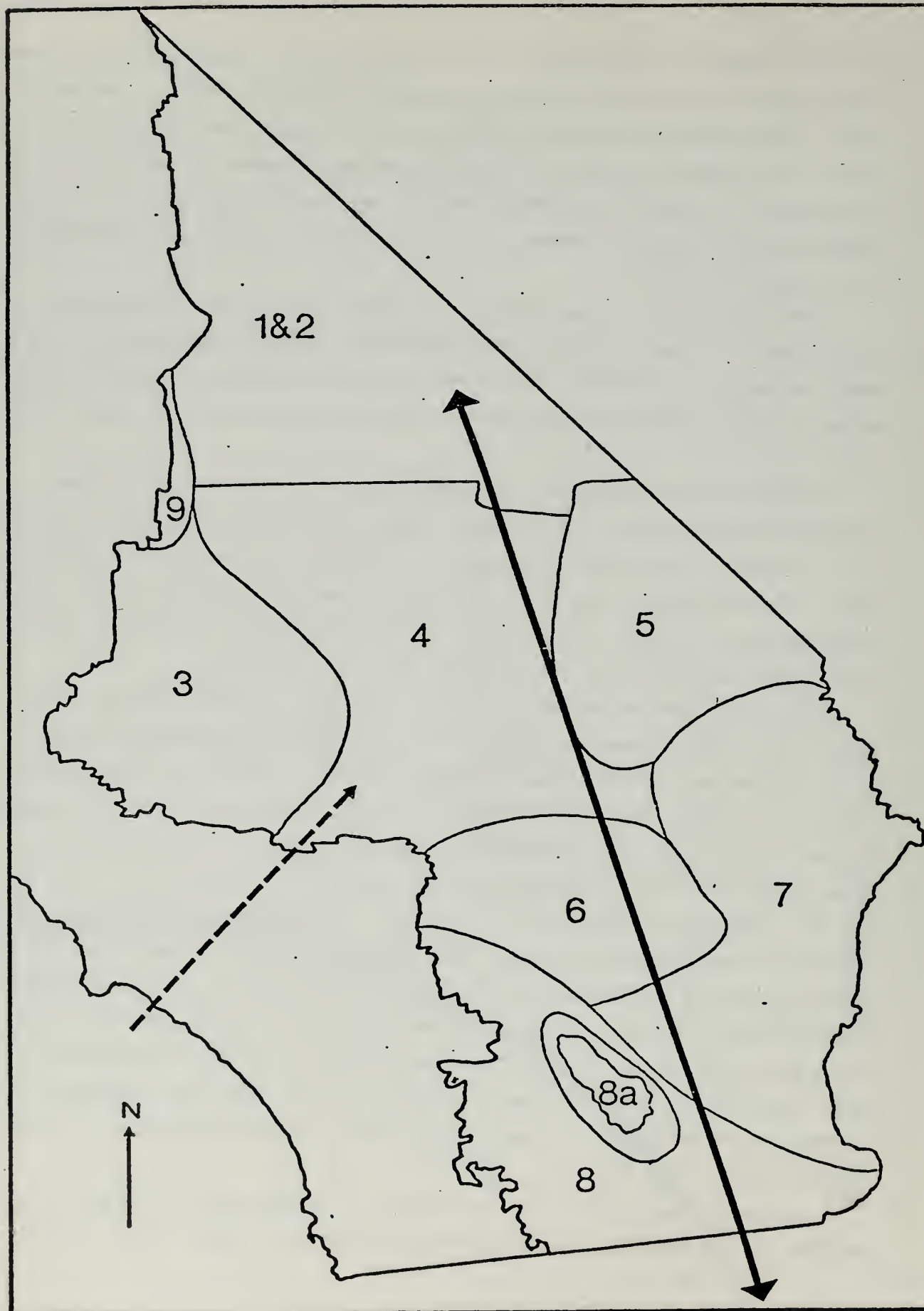


Figure 8. Postulated migration routes of White Pelicans toward breeding areas in Oregon and northern California, and western Nevada.

found after a tropical storm that brought large numbers of storm petrels to the Salton Sea.

HERONS, IBISES, WOOD STORK. There are scattered records of herons and ibises throughout the desert, except for Area I where there is no suitable habitat. Several species (Snowy Egret, Cattle Egret, Great Egret, Black-crowned Night Heron; and rarely others, e.g., Whitefaced Ibis, 1977) breed in colonies at the Salton Sea. Some of these birds reach the sea via an overland flight from the Gulf of California, as indicated by the occasional occurrence of Roseate Spoonbills (Wooten, 1952), White Ibises and Wood Storks, at the sea (records in American Birds).

A few species (e.g., Great Blue, Bitterns, Green Heron) probably migrate across the desert, descending when conditions permit. Spring records are more frequent than fall records, a result of greater observer effort at that season and greater availability of water. Fall records probably pertain largely to post-breeding wanderers from Salton Sea colonies.

Ryder (1967) reviewed the migration of White-faced Ibis in North America. He reported that a nestling banded in Utah was recovered near Blythe and inferred that the several thousand ibises that wintered in the Imperial Valley in the 1950's were derived from Great Basin colonies. (Note that the Great Basin colonies have recently suffered serious losses from pesticides.) Ibises are so rare in the desert region, except for Areas 8 and 8A, that they must traverse the area without stopping.

Except for two old records, the Wood Stork has only been found at the Salton Sea, where it occurs as a post-breeding wanderer from Mexico.

WATERBIRDS, INCLUDING DUCKS, GEESE AND SWANS, SHOREBIRDS. Many species of waterbirds and shorebirds pass over the California desert in spring and fall, as evidenced by the vast numbers that occur at the Salton Sea. This is the center for waterbirds in the desert. Data on populations are available from the Salton Sea National Wildlife Refuge, and are occasionally published elsewhere (e.g., Audubon Field Notes: 280-285, 1956; II 58-63, 1957).

The pattern of individual species is a result of status: winter visitors, passage migrant, post-breeder, local breeder. McCaskie (1970a) has discussed the status of shorebirds and waterbirds (excluding waterfowl, cranes and rails) at the Salton Sea, and some general patterns emerge.

Relatively few individuals of species which breed to the north remain as non-breeders through the summer, but the migration period of all these species, as a group, is so extensive that there is only a very brief period in late May and early June when the Salton Sea is not populated by a large number of migratory waterbirds. Several species whose range is primarily to the south occur in the Salton Sea as summer visitors, as a result of post-breeding dispersal. Most of these individuals are immatures. These species arrive from late May or June to September; a few may remain into November, but individuals of this group of species are virtually absent during the rest of the year.

Away from the Salton Sea, waterbirds are generally sparse, and occurrence is mainly as passage migrants. Salt-water species which disperse northward out of the Gulf of California or Salton Sea areas appear to be funnelled through the Coachella Valley and San Geronio Pass by the high mountains on either side of the valley (McCaskie, 1970e; Dunn and Unitt, 1977). This probably applies as well to migrants of basically salt-water occurrence (e.g., Black Brant: Nowak and Monson, 1965) which must cross overland from the Gulf of California to the Pacific. Species which breed to the north or northeast appear to migrate on a broad front directly over the desert. Many of these occur in oases, but the small numbers involved indicate that most pass on without stopping; small areas of suitable habitat in the desert do not comprise a significant resource for them. Indeed, it may even be advantageous for them *not* to stop as the stagnant water which is found in many oases (and even at the Salton Sea) harbors organisms that kill migrating waterbirds (e.g., Clostridium spp.).

Manolis and Tangren (1975) reported that increased availability of waste water in the Sacramento Valley has increased shorebird occurrence there in spring. Similarly, Dow (unpub.) has shown that waterfowl and shorebirds occur regularly, and sometimes in good numbers, at the sewage ponds at China Lake Naval Weapons Center. This is presumably true for some other desert areas.

DUCKS, GEESE, AND SWANS. Waterfowl, in general are adapted for long, non-stop migratory flights (up to 1500 miles for Snow Geese) and consequently are unaffected by conditions below, stopping in the desert only when

attracted by the irregular and unpredictable appearance of standing water, or when forced down by inclement weather (e.g., Webb, 1939; Wauer, 1962).

Distributional data, as is the case with other water birds, merely reflect the absence of waterfowl habitat in Areas 1 and 9. They do not suggest any significant patterns. Seasonal data show that the preponderance of records is for spring and fall.

Some banding studies, however, are of general interest. Rienecker (1976) reported that American Wigeon movements seem to be mainly eastward from the Imperial Valley, with recoveries in the vicinity of Salt Lake. Only 2 of the 2459 Snow Geese banded in northern California were recovered in Imperial Valley, which suggests (Rienecker, 1965) that the Imperial Valley birds probably migrate through Nevada, Utah, and Montana, and by-pass most of California. Rienecker (1968), studying Redheads, and Kozlik, Miller and Rienecker (1959) studying Snow and Ross' geese, obtained similar results: that the desert birds migrate largely east of the Sierras.

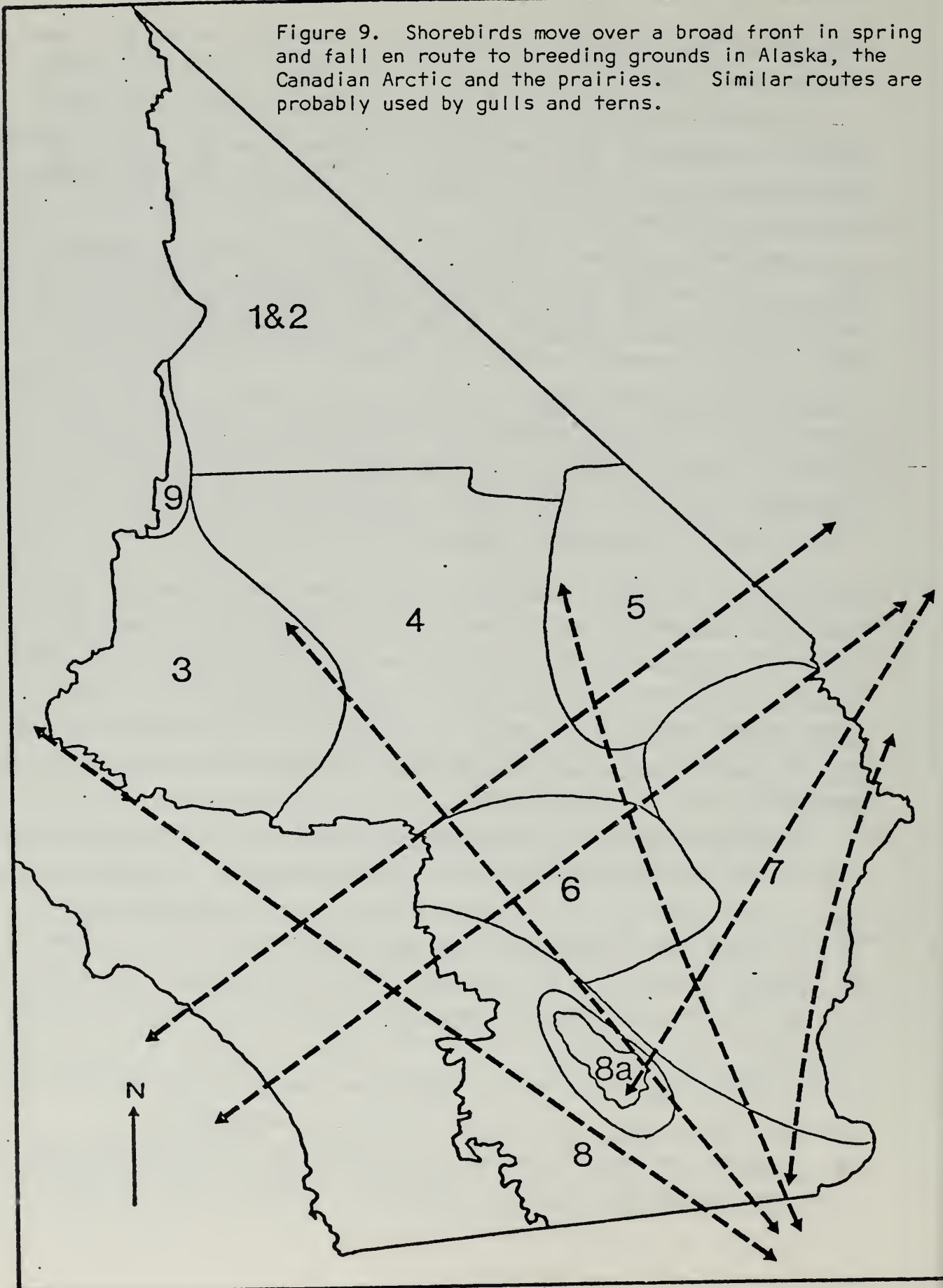
SANDPIPERS AND PLOVERS. Shorebirds that migrate over the deserts take directions depending on the locations of their wintering or breeding areas (Fig. 9). They may migrate to Alaska, the taiga or tundra of the Central Canadian Arctic, or to the prairies of southern Canada and the western United States. Nearly all species are adapted for exceptionally long non-stop flights (1000-4000 mile flights are not uncommon) and thus ground conditions are of little significance over most of their route.

Some species that breed in Alaska and winter on rocky coasts (Wandering Tattler, Black Turnstone, Surfbird) are accidental. They appear in spring (mostly) after moving northward through the Gulf of California to the Salton Sea. The Surfbird is especially interesting as it winters to southern South America and is common in the northern Gulf in spring; its rarity at the Salton Sea is evidence of its ability to undertake long flights.

Another Alaskan species, the Long-billed Dowitcher, is common at the Sea in spring and fall, and occurs regularly at desert ponds.

Species from the other breeding areas seemingly are less common inland, even though they winter in abundance at the Sea. Even interior-

Figure 9. Shorebirds move over a broad front in spring and fall en route to breeding grounds in Alaska, the Canadian Arctic and the prairies. Similar routes are probably used by gulls and terns.



breeding species (Mountain Plover, Avocet, Marbled Godwit, Long-billed Curlew, Willett, and Wilson's Phalarope) which might be expected to occur regularly, are very rare away from the Sea, indicating their ability to overfly the desert. Avocets, however, do nest regularly at China Lake (Moore, pers. comm.). Many individuals of these species winter along the Pacific coast, whence they begin their overland flight.

VULTURES, HAWKS, FALCONS. Little information exists pertaining to the migration of hawks through the California Deserts. Museum collections, the published literature, and raptor surveys are inadequate for drawing to conclusions about movements.

Residents of the California deserts have long recognized the existence of vulture movements through the desert. Watkins (MS) has now documented spring and fall migration through the Victorville region. The fall migration extends from 1 September to 31 October, with the peak (80% of the records) from 20 September to 10 October. In fall, 12,000-13,000 birds pass through the area. In spring, only about 1/10 as many appear. By observing flocks departing Victorville in fall, Watkins was able to map their route across 250 miles of desert (Fig. 9A). It extends "from the Tehachapi Mountains, where the vultures are funneled into a narrow band, through Victorville and Lucerne Valley to Blythe. This southeast direction of flight is necessary to avoid the San Gabriel and San Bernardino Mountains and to encounter suitable roosting sites." This route generally parallels the course of the Mojave River. Watkins speculates that in the past, riparian growth provided the only dependable and undisturbed roost sites for these birds. Although alternate roost sites exist today, the birds continue to use the historic flyway. Watkins also reported that the fall migration is rapid and the birds probably fast for about two weeks until they reach good feeding areas to the east and south. In spring, food is more plentiful and the birds move leisurely. Inasmuch as hawks and vultures often use the same conditions for soaring and migration, it is interesting that Watkins makes no mention of hawk movements in his paper.

Swainson's Hawk is a species whose migratory status is more easily assessed from the available data, since it migrates in large flocks,

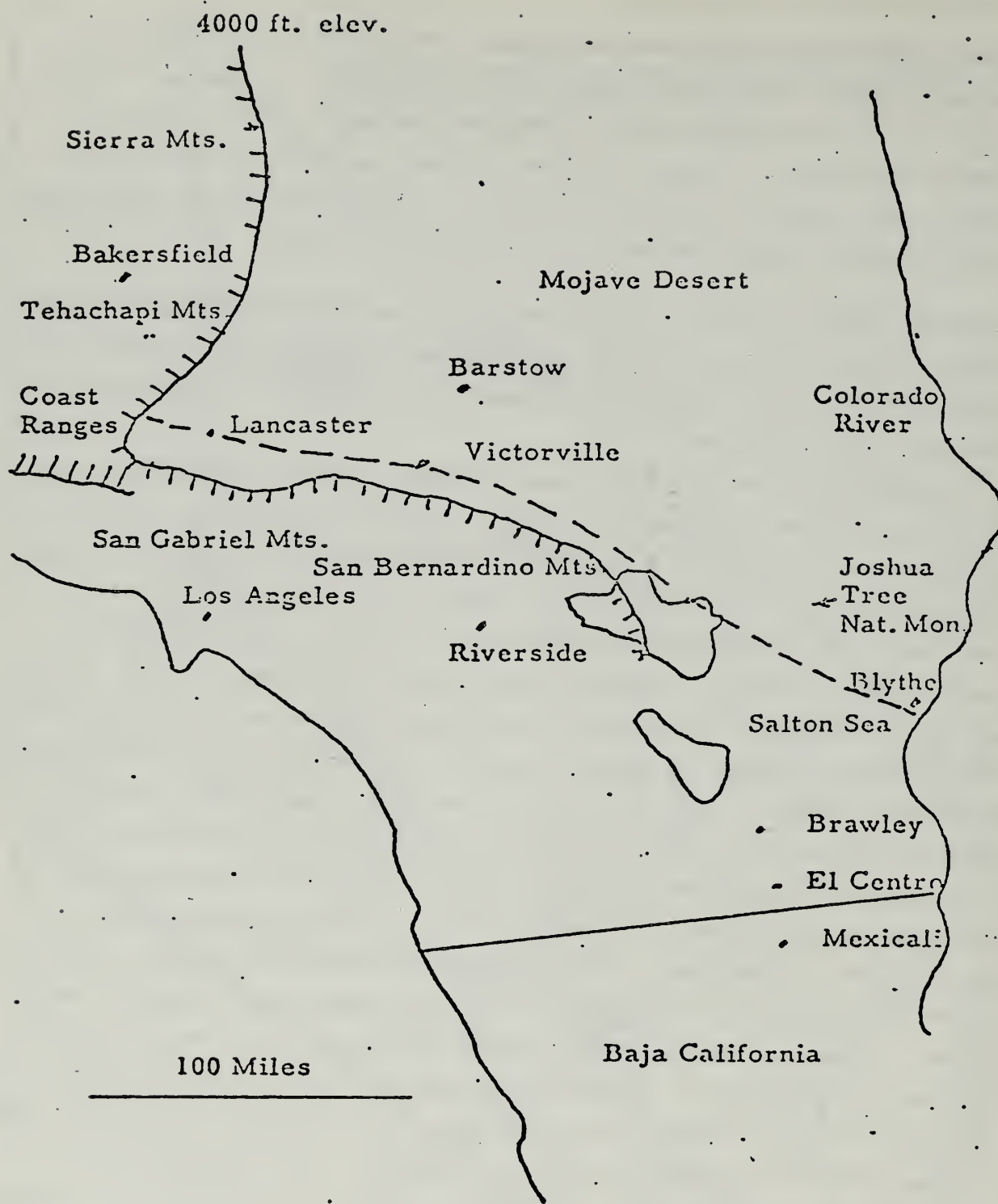


Fig.9A -- Charted portion of turkey vulture migratory route

winters entirely south of California, and breeds only sporadically (if not formerly?) in the central northern part of the desert. Numbers and breeding range of this species have declined severely in this century, but even old data are so vague as to be almost useless. Recent concentrations of Swainson's Hawks in the desert (120 on 10 April 1975 and 25 on 10 April 1976, both in the Borrego Valley (American Birds 29: 907-912, 1975 and 30: 886-894, 1976) were attributed to the presence of abundant food (caterpillars feeding on desert annuals).

Wilbur (1973) noted the presence of an apparently resident population of Red-shouldered Hawks near Victorville, and the species nests in Morongo Valley. This may reflect a recent invasion from coastal areas; there is no evidence that this population is migratory, though post-breeding dispersal is known.

Bond (1943) noted that the desert population of American Kestrel is resident, but that numbers increased in fall as a result of migrants from the north. The bulk of these migrants are attracted to agricultural, not desert, areas (Bond, 1943; Mills, 1976). The sexes seem to segregate by habitat in winter, with females predominating in agricultural areas, and males in residential areas.

D. W. Moore (pers. comm.) has noted power lines crossing the desert and are regularly used as perches by large raptors and provide these birds with hunting posts that formerly were unavailable.

No definite conclusions can be drawn about the migratory habits or routes of species of hawks or falcons. Migrants northward from mainland Mexico may travel over the desert at high elevations, much as do White Pelicans, and not rely on desert resources. They may drop into oases to roost or feed. Evidence for greater abundance of accipiters along the Colorado River and other riparian areas, and of buteos in cultivated areas reflects only local concentrations by suitable habitat and more abundant food sources. If any raptors do follow a definite route across deserts, it may be along the mountain ranges, (e.g., east face of Sierras, Lagunas; along Chocolate-Little San Bernardino chain), where updrafts create favorable soaring conditions. This is well known in the eastern United States,

but such concentrations points in California (Mount Tamalpais, Marin Co., Point Loma, San Diego Co.) are few.

GALLIFORM BIRDS. No North American quail is truly migratory. Gambel's Quail is the common quail of the California Desert, although the California Quail may extend onto the western part of the desert (and occasionally beyond). These quail can usually obtain sufficient water from their diet (Lowe, 1955) and require water only in the dry season or when feeding on dry food (Gullion and Gullion, 1964; Hungerford, 1960). However, they prefer to drink daily; all authors stress the importance of permanent water to the species (see also Beck, Engen, and Gelfand, 1973), and their distribution is clearly related to the distribution of water. Miller and Stebbins (1964) found them no more than 1 1/2 miles from water in May, when much succulent vegetation was available.

Gullion, in a series of papers, has documented the biology of Gambel's Quail. The species is monogamous in the breeding season, but the covey remains in loose association. In midwinter the home ranges of coveys ranged from 19-95 acres; their movements may be erratic--some coveys wandering, others remaining stationary. Most coveys seemed to be sedentary in January, but shifted up to 1/3 mile in early spring in search of nesting sites. Few, however, move any considerable distance. Movement stops in April when nesting starts and daily movements are few, ranging from 400-1250 feet. Recoveries of banded birds show movements of up to 6 miles from home, but this is very rare. In fall birds may be nomadic, but this depends on the success of the breeding season; high population pressure is associated with movements.

The California Quail is not as highly adapted to desert situations. It has been studied by Aldo Leopold and students (also Sumner, 1935). In general, it occurs near oases, but can tolerate dehydration and remain independent of water so long as succulent food is available. For the most part, the range of individuals is limited by the availability of water.

Chukars, introduced in the northern deserts, have been reported in Areas 6 and 8a. They are considered sedentary. There is no data on local movements.

Mountain Quail show altitudinal migration, but their extent is unknown. According to Miller and Stebbins (1964), "the life of Mountain Quail centers around drinking water" and birds confine their movements to within a mile of springs.

CRANES AND RAILS. Sandhill Cranes are rare in winter in the Imperial Valley and are accidental elsewhere. Grinnell and Miller (1944) were unable to assign most birds racially, and thus the area of origin (and migration route) is uncertain.

The occurrence of rails is dictated by the presence of wet habitats. Accordingly, there are no records for Areas 1 and 9. Species with broad distributions (Virginia, Sora, Common Gallinule) have appeared in many areas and presumably cross the desert non-stop. Black Rails are rare and breed locally in Areas 8 and 8a. Clapper Rails are uncommon residents at the Salton Sea, with records for Areas 3 and 6. Nothing is known of their movements.

Coots are abundant at the Salton Sea and breed in several desert oases (e.g., Furnace Creek Ranch). Like other rails, they fly strongly and easily cross vast stretches of unsuitable habitat. There is no reason to believe that they follow any definite routes..

GULLS, TERNS, SKIMMERS. Most species of gulls occur irregularly at the Salton Sea and none currently breed there. They are rare elsewhere, although some species (e.g., California, Ring-billed) cross the desert regularly in large numbers.

Devillers et al. (1971) reviewed the status of some large gulls in southern California and discussed the origin and movements of those seen at the Salton Sea. Among species that approach the limit of their range, (Western, Thayer's, Glaucous-winged, Glaucous) immatures predominate. The opposite is true of the Yellow-footed Gull (Larus occidentalis livens), which reaches the sea in summer after a post-breeding dispersal northward from the Gulf of California. Ring-billed Gulls are abundant in winter. A few individuals of other species reach the sea on northbound migration, after being "trapped" in the Gulf, whereas others arrive in fall after

overland flights from the Pacific coast or the interior of North America (Thayer's Gull, Bonaparte's Gull).

In any event, the numbers involved are small, except at the Salton Sea, and the birds do not rely on desert habitats.

Similar patterns are found among terns, which occur at the Salton Sea but are very rare elsewhere. There species breed at the sea (Caspian (formerly), Forster's: common; Gull-billed, uncommon). Only one species shows significant overland migration: Black Terns occur by the thousands at the sea (10,000 +) in spring and summer, as the birds move from wintering grounds at sea to inland breeding areas. Although they must move overland and in substantial numbers, they are almost unrecorded away from the sea (absent from Areas 1, 5, 9). No routes are evident (Fig. 9).

Black Skimmers have recently invaded the Salton Sea (first records 1968; bred 1972 and since), and up to 500 were present in the summer of 1977. Most leave in winter and move to the Gulf of California or farther south (Fig. 6).

DOVES AND PIGEONS. Band-tailed Pigeons occur in desert areas only as irregular visitants to mountainous areas (e.g., Panamints; Paige, 1964) where they may winter in small flocks. They are very rare elsewhere (Neff, 1947). (See also Blackman, 1976, for a detailed review.)

Mourning Doves are common and widespread from spring through fall, but depart the northern areas in winter (no winter records from Areas 1, 2, 5) for wintering grounds in the southwest and Mexico. In some areas (5) there seems to be a major influx in early May (Remsen, MS). They need to drink daily (MacMillen, 1962) but because they are strong and rapid fliers can exist in areas far from surface water. According to Bartholomew and Dawson (1954) "the capacity of doves to endure elevated temperatures and extensive dehydration combined with their capacity to make up water deficits quickly and their ability to fly long distances allows them to meet the demands of desert existence".

White-winged Doves are summer residents of the Colorado but not Mojave Desert. They, too, "seem to require water" (Miller and Stebbins, 1964). Most individuals arrive in May and depart in September for wintering grounds in Mexico. They move widely but probably need to drink twice

daily (MacMillen and Trost, 1966), which restricts their range. Records from Areas 2, 4, 5, and 6 (north of the Colorado Desert) largely pertain to non-breeding or post-breeding wanderers.

Ground Doves are resident in the Colorado Desert (Areas 7, 8 and 8a) and occur occasionally in spring and summer in the southern Mojave Desert (Areas 5 and 6). Their daily movements are restricted to very small areas, and they drink repeatedly when the temperatures are high (Willoughby, 1966).

ROADRUNNERS, CUCKOOS. Roadrunners are resident in all areas of the desert. They are ground-dwelling and highly mobile. They do not require water, and may roam widely, but we have been unable to find any data regarding their daily or seasonal movements.

Yellow-billed Cuckoos formerly nested in riparian situations along the coastal strip (Owens Valley) and Colorado River, and occasionally wandered into the desert. The populations are now much reduced (Gaines, 1974) but recent studies (Gaines, unpublished) are said to indicate that a few breeding pairs occur in the Amargosa Gorge near Tecopa. However, this species is not expected in the desert areas.

OWLS. Several species of owls are resident in parts of the desert. They obtain sufficient moisture from their diet, and do not need to drink regularly (if ever). The literature on desert owls is scanty. Miller and Miller (1951) considered the desert Screech Owl (Otus asio yumanensis) to be essentially non-migratory.

The Elf Owl is extremely rare in California, is (or was) known from only one or two oases in Areas 6 and 7. The species is migratory (Miller and Stebbins, 1964; Phillips, 1942); comments about possible routes in California are speculative. L. Miller (1946) suggested that the Joshua Tree area was a "stepping stone" for the dispersal of this species.

The migratory status of Burrowing Owl, a species common at least in the Imperial Valley, has not been well ascertained. According to Martin (1973) the Burrowing Owls of California have been thought to be non-migratory (Brenckly, 1936) or partly migratory (Coulombe, 1971), with immigrants from Northern California appearing in Southern California. In New Mexico the

species is definitely migratory, departing in August and September and arriving in mid-March.

The only owl species for which migration has been discussed in the literature is Flammulated Owl. Johnson (1963) suggested this species might actually be non-migratory, spending the winter in torpor on or near the breeding grounds. Attempts to experimentally induce torpor (Banks, 1964) were unsuccessful. Balda, McKnight and Johnson (1975) discuss the migration of the species in the southwestern United States. Definite migration of this species was noticed in Arizona and New Mexico in both spring (16 April - 16 May) and fall (1 Sept. - 21 Oct.), with indications of occurrence at higher altitudes in fall.

Flammulated Owls breed in the Yellow Pine forests of the western United States and winter in Central America. They probably cross the desert non-stop. Through 1977 there are only five records for desert oases. As Winter (1974) comments "migration patterns are virtually unknown in the state".

GOATSUCKERS. Poor-wills may be permanent residents of the desert or may leave the area in winter (Brauner, 1952). Miller and Stebbins (1964) found no indication of migration. Nothing is known about intra-desert movements. The species can undergo torpor when food supplies or temperatures are low (Bartholomew, Howell, and Cade, 1957; Howell and Bartholomew, 1959). Jaeger (1948a, 1949a) studied hibernating birds in the Chuckawalla Mts. in winter, and possibly this population does not migrate. Ligon (1970) noted that "hibernating Poor-wills have been found only in the extreme southwestern portion of the United States, where cold periods are of short duration and flying insects are irregularly available throughout the winter". The survival value of torpor is greatest in spring "when returning migrants may be faced with cold and perhaps wet weather for several days".

Poor-wills are also well adapted for extreme heat. Lasiewski and Bartholomew (1966) and Bartholomew, Hudson and Howell (1962) found that it had the greatest efficiency of evaporative cooling in any bird thus far tested.

Lesser Nighthawks are common summer residents in all but mountainous areas. They are able to tolerate extremely high temperatures (Cowles and

Dawson, 1951), but can become dormant when temperatures are low (Marshall, 1955). This species migrates out of the desert in winter and there is no evidence of hibernation.

The inferred migratory route of the Lesser Nighthawk is through Mexico. In May, 1977 Jehl saw large flocks migrating northward at dusk in the Calxico area. Intra-desert movements are not well known. However, Caccamise (1974) pointed out that "since food and water in many of the habitats utilized by C. acutipennis are highly dispersed [the birds] need to wander over great distances in search of these resources". Apparently much of the foraging is done in pairs or in family groups, which facilitates food finding. However, foraging range has not been established.

SWIFTS. "Swifts, like swallows, ...face no particular difficulties in migrating across deserts" (Miller and Stebbins, 1964:96). Vaux's Swift migrates in April-May and September. Presumably the crossing is direct and rapid, as few feeding areas are available. Surprisingly, the species is unrecorded in Areas 1 and 9, and only "small numbers" are recorded from Joshua Tree National Monument (Miller and Stebbins, 1964). Fall records are less numerous.

White-throated Swifts occur widely in the desert in spring and summer but are uncommon at other seasons. Most evidently leave in winter. There are no data on local movements.

WOODPECKERS. It is hardly surprising that tree-inhabiting species are rare in treeless terrain. Accordingly, few woodpeckers migrate through desert regions, although the strongly migratory Red-shafted Flicker and Yellow-bellied Sapsuckers occur widely in spring and fall, and both winter commonly in oases or in riparian situations. Devillers (1970) reviewed sapsucker distribution in California. Lewis' Woodpeckers may occur in large numbers in oases in the northern deserts (e.g., Furnace Creek) in fall or winter, but their movements are erratic.

Several woodpeckers, however, are adapted to desert regimes. The Ladder-backed is a desert resident, commonest in the Colorado Desert. "A given pair may be followed a mile or more through the Joshua trees, and they evidently have large territories" (Miller and Stebbins, 1964). They

do not seem to require water. Two other residents, the Gila Woodpecker, and the Gilded Flicker of the southern and eastern deserts are now very rare and also on the verge of extinction (Remsen, MS). These species are not known to undergo seasonal movements; daily movements and ranges are unreported.

HUMMINGBIRDS. The migration routes of Allen's, Calliope, and Rufous hummingbirds have recently been discussed by Phillips (1975, Figure 4; herein reproduced as Fig. 10). All are similar, although the periods of migration differ. Allen's begin migrating in December or early January. Although their major movements are coastal, some must cross the southwestern corner of the desert; yet, we have found no data to support their occurrence there. Rufous and Calliope migrate in March-April along a similar route, and are commoner than Allen's. Black-chinned and Broad-tailed (in the east) hummingbirds cross the desert commonly in spring; their fall movements have not been studied.



Figure 10. Migration of hummingbirds (from Phillips, 1975).

FIGURE 4. Apparent migrations of adult male *S. rufus* nesting in Montana and Idaho. Vertical lines show range of populations that have been mapped (solid arrows); stippling shows general breeding range.

Interestingly, Rufous Hummingbirds are regular in the southern deserts in spring, where they may defend flowering ocotillos or mesquite against other species, but rare in Area 6 (Miller and Stebbins, 1964). The species is commoner in Area 6 in fall, but all records are of females or (mainly) immatures. Miller and Stebbins (1964) noted that "this hummingbird seems to suffer losses while crossing the desert when water and flowers for nectar sources are scarce."

Anna's Hummingbirds are rare in the deserts, and most records east of the coastal breeding range pertain to immatures (van Rossem, 1945); this species seems to be extending its range eastward (Zimmerman, 1973), perhaps in response to new habitats that become available as human encroachment expands.

Costa's Hummingbird is the only desert-breeding species, and a few may be found year-round in the southern deserts (Areas 8, 8a). They migrate north in February-March, are strongly territorial in the breeding season, and probably do not move far from their food supplies. However, Miller and Stebbins (1964) suspected movement west, to higher elevations, during the heat of the summer. Cody (1968) reported interspecific territoriality among migrating hummingbirds near Amboy, with several species contending for bladderpod flowers (Isomeris arborea). Interactions between residents and migrants requires additional study.

FLYCATCHERS. Manolis (1973) reviewed the status of Eastern Kingbirds in California. As most of the spring records were from relatively late in the season, he speculated that birds entered the state "in a roundabout way from the east". If he is correct, spring migrants would largely avoid desert regions. Several authors have indicated that the movements of Eastern Kingbirds may be influenced by those of Western Kingbirds. What this may mean is not clear: Phillips et al. (1964) cryptically noted that the Western Kingbird "has some extraordinary migrations which are not fully understood."

The migrations of some flycatchers are relatively well known, however. Johnson (1965, 1970) showed that Hammond's Flycatcher had two peaks of spring migration; the first migrants moved west-northwest from Arizona,

across the Colorado Desert, to the coast, then northward; the second wave moved largely through the interior (at higher elevations?, Remsen, MS), but few birds reached the northern deserts (Fig. 11). He thought that the early "coastal route" had evolved as a response to food availability. The fall migration takes place largely through the major mountains, before birds cross into the southwestern deserts. The fall migration does take place over a much broader front, but a high percentage of desert records are of immatures.

Johnson (1973) also studied the spring migration of the Western Flycatcher and showed that there were large numbers of migrants in the Lower Colorado Valley and along the coast, but very few from the Mojave Desert. In fall, adults predominate in the western desert, immatures in the eastern part which suggests most birds far from mesic habitats are lost vagrants, not regular migrants (Fig. 12). Traill's Flycatcher may have a similar pattern, as it is common in fall, absent in spring at Joshua Tree (Miller and Stebbins, 1964).

A different pattern is shown by one race of Say's Phoebe (quiescens) from northern Baja California, which apparently wanders northward in fall; some individuals winter in the southern deserts.

HORNED LARKS. Resident races of Horned Larks are found in the Colorado and Mojave deserts. Numbers are augmented in fall and winter, with the arrival of birds from more northerly breeding areas (Behle, 1942); the majority flock to cultivated fields in the Imperial Valley. Because of the widespread breeding range of this species it is not possible to infer much about potential routes across the desert.

SWALLOWS. Large numbers of swallows occur in the agricultural areas of the Imperial Valley in spring and fall. Many have heavy fat deposits, which allow them to cross arid regions quickly (Miller and Stebbins, 1964), lingering only in cultivated areas or near water, where flying insects may be present. Their routes are not known, although in fall in Area 6 they are alleged to follow the mountain ridges NW-SE (Miller and Stebbins, 1964).

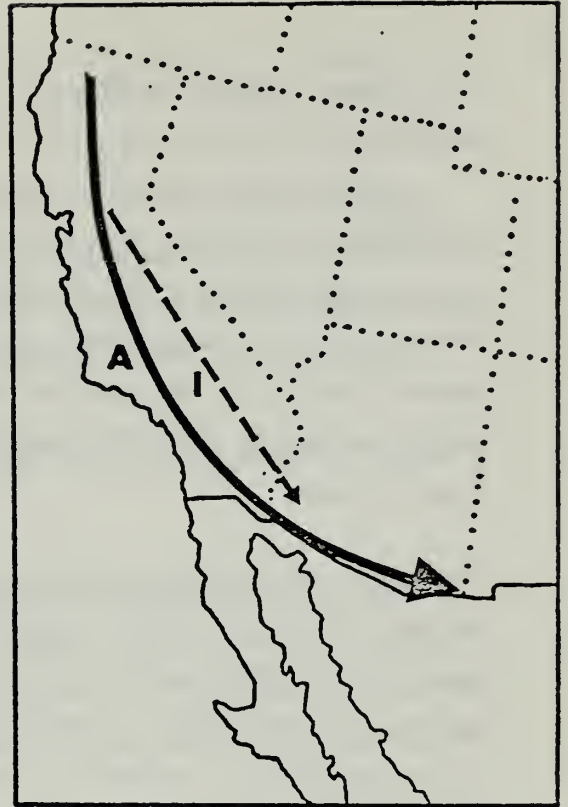
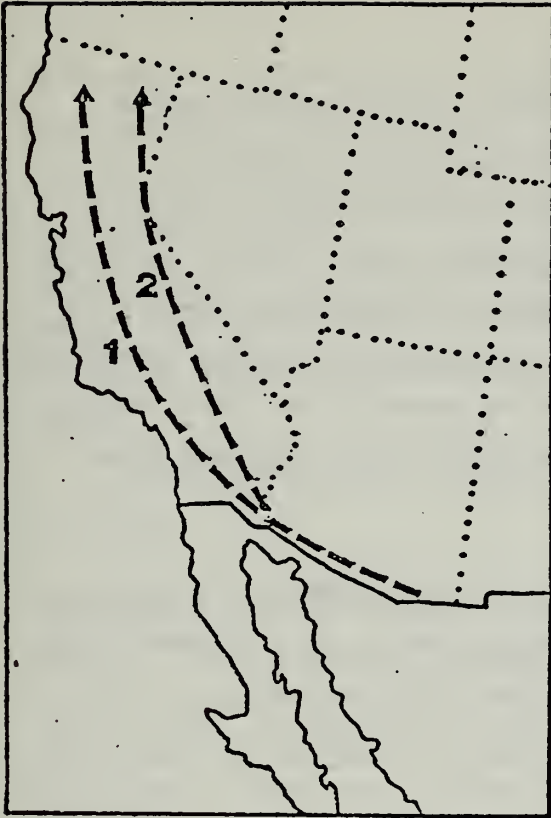


Figure 11. (Left) The spring migration route of Hammond's Flycatcher. A similar pattern is exhibited by the Western Flycatcher (Johnson, 1965, 1973). An early movement ("1") follows the coastal route; later migrants ("2") are more likely to take a direct route across the desert.

Figure 12. (Right) The fall migration routes of Hammond Flycatcher and Western Flycatcher (after Johnson, 1970, 1973). Most adults move southward through the mountains and coastal strip before crossing the desert. Immatures are found far out over the desert. Similar fall routes may be exhibited by a wide variety of species.

Virtually all leave in fall, some species moving as far south as Tierra del Fuego. Lasiewski and Thompson (1966) noted that Violet-green Swallows in Death Valley can undergo torpor.

CROWS AND JAYS. Austin (1971a) conducted year-long censuses of Common Ravens in the Mojave Desert; they were common along roads in winter, uncommon along roads in summer. Density was greatest along major roads, indicating that the birds were responding to the availability of road kills.

All summer records were within 15 miles of water. We infer that daily movements from nesting cliffs probably do not exceed this distance.

Pinyon Jays occur in some desert mountains and may undergo sporadic movements in winter that carry them onto the desert floor. Scrub Jays are more widespread but, similarly, show no evidence of regular movements. Pitelka (1951) showed that altitudinal migrants are almost always immatures; adults remain in the general area of the nesting ground. Of 43 fall-taken birds at Joshua Tree National Monument, 40 were adults (Miller and Stebbins, 1964).

TITMICE. Verdins are common residents of the Colorado Desert. Studies in Arizona (Taylor, 1971) suggested that they moved widely, as the numbers of banded birds decreased sharply at the end of the breeding season: of 23 adults and 27 nestlings banded in one area, only one remained to breed the following year. Apparently the birds become nomadic, at least in some years, but the extent of the movements is not known. Mountain Chickadees may move to lower elevations in winter; these movements are largely composed of immatures (Dixon and Gilbert, 1964). Miller and Stebbins (1964) reported a high ratio of adults among Chickadees (19:3), Plain Titmice (4:1) and Bushtits (4:1) at Joshua Tree National Monument in fall.

NUTHATCHES AND CREEPERS. Nuthatches and Creepers are rare in the desert, occurring mainly in fall and winter. Movements are unpredictable and involve very few individuals, of which the vast majority are immature (Miller and Stebbins, 1964). In "flight years" Red-breasted Nuthatch interruptions may bring good numbers onto the desert. There are no data to indicate regular movements across or in the desert, although K. Berry informs us that numbers appear in the China Lake-Ridgecrest area each fall.

WRENS. The Cactus Wren is a resident of the desert. Studies in Arizona (Anderson and Anderson, 1957; and many subsequent papers) have revealed no evidence of migrations, though individuals may wander widely. There are no relevant studies of Rock Wren, a resident of rocky desert slopes. Both of these species can meet their water needs dietarily (Ricklefs and

Hainsworth, 1968; Smyth and Bartholomew, 1966), so that their range and daily movements are not restricted by the availability of surface water. The same is probably true of the Cañon Wren.

Regarding Bewick's Wren, Swarth (1916) stated that only T. b. eremophilus "has truly migratory habits". "The birds found on the Colorado Desert during the winter are apparently migrants from the desert mountains to the northward." He found no evidence of regular migrations in other races.

Other wrens occur in small numbers as migrants and are usually found in oases.

MOCKINGBIRDS AND THRASHERS. Mockingbirds have been recorded in all but Area 9. They are often assumed to be resident, but Remsen (MS) indicates that in Area 5 their status shifts seasonally, from fairly common in spring and summer to uncommon in fall and winter. Nothing is known of their movements.

Few desert mimids have been studied in detail. Shepard (1970) found that LeConte's Thrashers probably mate for life and remain year-round in the same territory (ca. 100 acres); he found no evidence of movement or migration, although immatures are occasionally found well out of range in the late fall or early winter. However, Remsen thought that the species left Area 5 in winter; thus, there may be regional differences in movement patterns.

Bendire's Thrasher is present in spring and summer. Remsen gave records from March-August in Area 5, and noted that birds "are already on the move in late July".

Crissal Thrashers also show a post-breeding dispersal in July (Remsen, MS). As they are much less frequently recorded in fall and winter, some seasonal movements seem likely.

The Sage Thrasher is the only mimid that has been recorded in each of the desert Areas. It is a migrant from the Great Basin, occurring widely and fairly commonly in spring, perhaps less commonly in fall; a few winter in the south. The bulk of its migrations might be expected to occur in the eastern deserts, but there are no quantitative data.

Detailed studies of the biology of desert thrashers are needed.

THRUSHES. Robins have been reported at all seasons, but are unrecorded for three seasons in Areas 1 and 9. They winter, often in large numbers, near irrigated areas, especially in the southern desert. The Hermit Thrush occurs in spring and fall, and winters in southern areas (4, 5, 6, 8, 8a). Swainson's Thrush is exclusively a migrant, but much more common in spring than in fall (e.g., Area 5, fairly common spring, one fall record: Remsen, MS). Western and Mountain bluebirds have been found in most areas, but their movements seem irregular. Both winter in the southern desert, the abundance of Mountain Bluebirds varying sharply from year to year. Although these birds are attracted to vegetated areas, they are not known (or expected) to follow precise routes through the desert. The occurrence of other thrushes is too rare or irregular for analysis.

GNATCATCHERS AND KINGLETS. Blue-gray Gnatcatchers and Ruby-crowned Kinglets are widespread in migration, the Kinglet being common at times; both may winter in the southern areas. Phillips (1975) suggested that desert records of the Golden-crowned Kinglet may pertain largely to vagrants from the east, but this is doubtful in view of the large numbers that may occur.

Black-tailed Gnatcatchers are considered resident in the southern desert (west to Area 4, north of SE Area 2). There are no data on movements.

PIPITS, WAXWINGS, SHRIKES. Water pipits are common spring and fall migrants through most Areas (except 1 and 9) and winter in the Imperial Valley. They presumably move across the desert on a broad front. Cedar Waxwings occur in spring and fall, and winter in some areas. Their yearly movements are sporadic and unpredictable. Loggerhead Shrikes are permanent residents in lowland areas, perhaps but not in the mountains (Areas 1 and 9), for which we have found no fall or winter records; presumably they disperse to lowland deserts. Shrikes are wide-ranging and, as they obtain moisture from their diet, their distribution is not restricted.

PHAINOPEPLA. The migration pattern of this species is unusual and still not clearly defined. Although it occurs in the desert year-round, most birds leave the desert in April and move to the coast (where they undergo a

second breeding season ?) before returning to the deserts in August (Dawson, 1924; Crouch, 1943; Walsberg, 1975). L. Miller (1957) suggested that birds crossed the mountains through passes (see Fig. 2). In the desert they are largely restricted to areas of mesquite and ironwood, as their major food is desert mistletoe.

STARLING. This introduced species arrived in California in the 1940's. Banding returns suggest a tendency for a NE-SW migration, with the winter population in California being a mixture of permanent residents and migrants (Royall, Guarina, and Siebe, 1972). There are no data specific to the deserts.

WARBLERS AND VIREOS. The movements of these groups through the desert are well summarized by Miller and Stebbins (1964). The western species occur largely as migrants, and a 700 mile crossing is within their flight range. Gray and Plumbeous Solitary vireos, Orange-crowned, Yellow-rumped and Black-throated Gray warblers breed locally in mountain habitats in Areas 1, 5 and 9, whereas Bell's Vireos (formerly), Lucy's and Yellow Warblers, Yellow-throats, and Yellow-breasted Chats nest locally in riparian habitats.

All west coast breeding species occur regularly in spring and fall migration, but numbers are much larger in spring; and in some cases birds reaching Joshua Tree represent inland, rather than coastal races (e.g., Vireo gilvus leucopolius). This suggests that the coastal populations may cross over the southern desert and move northward through the mountains (see Fig. 11). Numbers in spring exceed those in fall, and the fall flights of most species are dominated by immatures (see Miller and Stebbins, 1964). Miller and Stebbins have mapped the fall migration of Hermit Warblers through Joshua Tree National Monument (Fig. 13), but the routes suggested seem speculative to us.

Yellow-rumped Warblers winter commonly throughout the desert, and Orange-crowned Warblers and Yellowthroats winter near the Salton Sea. Few other species winter.

The patterns of migratory birds to seek specific types of habitat to which they are best adapted is well known (Phillips, Marshall and Monson,

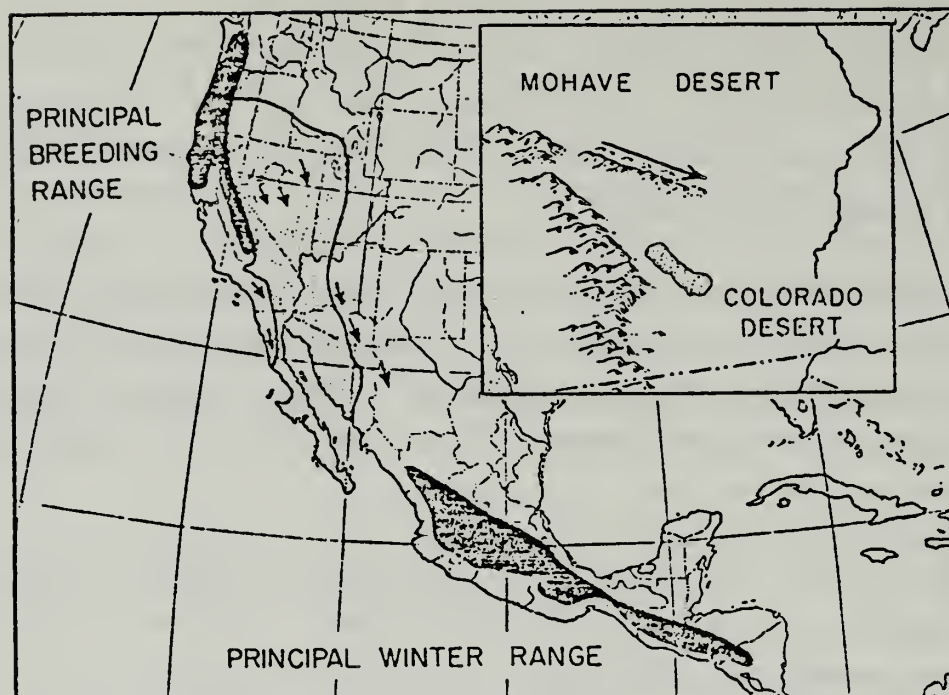


Fig. 65. Map showing principal breeding and winter ranges of the hermit warbler and some known routes (arrows) followed in fall migration. As in many species of warblers, the extensive desert and arid Great Basin areas (stippled) must be traversed during the heat and drought of late summer; insert shows one route of crossing along the Little San Bernardino Mountains.

Figure 13. Migration routes of the Hermit Warbler (from Miller and Stebbins, 1964, p. 215).

1964: ix). This has also been noted by Remsen (MS), who noted that migrating Yellow Warblers were rare in mountains but common in lowland habitats.

WEAVER FINCHES. The House Sparrow, an introduced pest, is widely established. We have found no records for Areas 1 and 9 at any season, or for Area 4 in summer, Area 4 in fall, and Areas 3, 4, 6, and 7 in winter. These data suggest a seasonal dispersal from the Mojave Desert, which is interesting because the species is usually considered to be resident throughout its range.

BLACKBIRDS AND ORIOLES. Blackbirds are strong fliers and move across the desert to mesic breeding areas in the north and Great Basin. Banding data for Yellow-headed Blackbirds are insufficient to determine anything about

movements through California or about the breeding range of wintering birds (Royall et al., 1971). Rusty Blackbirds are rare but regular at oases (mainly Death Valley) in fall, suggesting a regular route to the southwest (desert flight line?). They are clearly attracted by water.

Northern (Bullock's) Orioles are common and conspicuous migrants in the southern deserts in spring, where they are often seen feeding at ocotillo flowers. They are much less common in fall migration and either overfly the desert or work southward through the mountains before crossing.

WESTERN TANAGER. The Western Tanager is the only tanager that regularly passes through the desert region. It has been recorded in all areas in spring and in all but Area 1 in fall. Its migration routes are unknown. Because it is a conspicuous species, detailed studies of its movements would be warranted. Cooke (1925) noted that birds occupying the northwestern portion of the range arrive on the breeding grounds earlier than those in the inland west. Summer Tanagers are rare summer residents.

FRINGILLIDS. Owing to its tolerance for heat (Salt, 1952) and water of high salinities (Poulson and Bartholomew, 1962) the House Finch is one of the most widespread desert birds. However, it cannot subsist on a dry diet for much longer than a week (Bartholomew and Cade, 1956). Accordingly, its range is probably controlled by the distribution of surface water.

The Black-throated Sparrow can subsist entirely on dry food (Smyth and Bartholomew, 1966), which explains its very broad distribution. The closely related Sage Sparrow can maintain its weight without drinking, but only when feeding on succulent foods, which are only seasonally available. Thus, it migrates (Moldenhauer and Wiens, 1970).

Remsen (MS) has presented some extremely interesting information with regard to these two species. In summer the Black-throated Sparrow occurs in a variety of habitats, but in winter is found mainly around the bases of rocky hills at 2700-5400 feet. It expands into other habitats in March, and Remsen feels "that these birds must be migrants from the south rather than from the local wintering populations [in Area 5]. The expansion coincides with the departure of the congeneric Sage Sparrow, and

competition between the two species is very likely, especially considering that the only habitat in which the Black-throated Sparrow remains in any numbers during the winter (rocky slopes) is one of the few habitats where the Sage Sparrow is very scarce."

White-crowned Sparrows winter in some desert oases but require fresh water and succulent foods. They have no special adaptations for desert existence (MacMillen and Snelling, 1966).

The arid-land towhees (Brown and Abert's) have been extensively studied. Abert's Towhee is more heat tolerant and occupies true desert areas (Dawson, 1954), whereas Brown Towhees occupy the periphery. One race of Brown Towhee is very rare and restricted to the Argus Mountains (van Rossem, 1935); no seasonal movements are known.

Swarth (1920) in a taxonomic study of the Fox Sparrow suggested that one race, canescens, overflow the desert in migration. This finding requires confirmation by more thorough collecting.

Members of the genus Spizella are often found in the desert. Little had been published regarding the Chipping Sparrow. The Brewer's Sparrow has a localized distribution and in Area 5 is a fairly common migrant and summer resident in washes. Presumably the local population winters in Baja California and moves widely through suitable habitat. McCaskie (1973) has documented the migration of a rare species, the Tree Sparrow, which occurs widely in oases in eastern California. He suggested that this region is the western limit of the species normal route.

The Lark Bunting, like Brewer's Sparrow, winters (or formerly wintered ?) commonly in southern Baja California, and one would expect it to occur regularly in the California deserts. Wilbur et al. (1971) consider it a rare and irregular migrant at present, whereas earlier authors thought it to occur regularly and sometimes in large flocks in eastern California. Whether this indicates a change in local status or a decreasing population as a result of changes in the breeding-grounds ecology (cf. Braun et al., is not known.

The Song Sparrow shows the most extreme geographic variation of any North American bird, and one race, *saltonis*, is considered a permanent

resident in the southern deserts (Grinnell and Miller, 1944). Nothing is recorded of its local movements, although it seems tied to riparian situations.

Black-headed Grosbeaks are conspicuous desert migrants and must cross desert terrain to reach wintering grounds in northwestern Mexico. Miller and Stebbins (1964) suggested that they flew southeastward from Joshua Tree in fall. They also noted (p. 232) that:

The direction of migratory movement [in fringillids] has been observed only in those relatively common species that fly well above ground in the open. Thus the black-headed grosbeaks and lazuli buntings have been seen in the fall making prolonged flights that have a southeastward direction, such that would probably take them across the lower Colorado River basin to southern Sonora. In spring little has been recorded of the direction of flight.

The fall flight of grosbeaks is dominated by immatures (12 of 13 specimens from Joshua Tree National Monument).

Many other species of fringillids can be found in the desert, and their general status is treated in comprehensive works on the state. Except for the irregular irruptions of northern finches, or altitudinal movements of Purple Finches into some areas, there seems to be little specific information on routes or movements.

THE OCCURRENCE OF EASTERN VAGRANTS. Almost all species of migratory landbirds that breed in eastern North America have been recorded in the desert. This area lies beyond--or at the western limit--of their usual migratory pathway. For some, the desert is far enough from the straight-line route between breeding and wintering ranges to indicate that their occurrence is due to faulty navigation or orientation. Nevertheless, such species occur annually in substantial numbers. Phillips (1975), discussing polytypic species, emphasizes the importance of collecting individuals that are out of place seasonally, because the probability that they represent vagrants from eastern populations is high. Such data can provide important information on the origin, migration, and dispersal of populations.

Several factors--proximity of California to normal migration route, angle of deviation from normal route to reach California, and abundance--

affect the probability that a vagrant will appear in the desert (DeBenedictis, 1971; McCaskie, 1970; 1970; Binford, 1971; Austin, 1971b); behavioral factors (e.g., secretive, open-country inhabitant) affect the probability that it will be observed. Some families (e.g., Parulidae) seem prone to vagrancy, whereas others (e.g., Turdidae) do not.

Several species that breed in British Columbia and winter in western Mexico, and were "rare" or unrecorded in California in 1944 (Grinnell and Miller, 1944) are now known as regular migrants in small numbers (e.g., Black-and-white Warbler, Ovenbird, Northern Waterthrush, American Redstart, Clay-colored Sparrow). Several others that winter in eastern Mexico or the West Indies are regular enough to suggest a normal migration (Tennessee Warbler, Parula Warbler, Black-throated Blue Warbler, Black-throated Green Warbler, Chestnut-sided Warbler, Summer Tanager, Rose-breasted Grosbeak, and Indigo Bunting). However, since California lies far off their normal route, since their arrival dates are late, and since most records represent immatures (Miller and Stebbins, 1964, and many other papers dealing with individual species; also unpublished data from museum specimens) their presence seems attributable to the wandering of lost juveniles (see also Ralph, 1971).

The migration patterns of some species are complex. Binford (1971) considered that the early movement of Northern Waterthrushes in the fall (16 Aug. - 13 Sept.) consisted of normal migrants from western populations, whereas later dates represented eastern vagrants; a similar pattern may occur in the Red-eyed Vireo.

Evaluating the distributional patterns of vagrants is difficult because observer effort varies. Once a concentration of "rarities" is found, birders tend to return year after year, at approximately the same time. And each year, more and more birders visit desert oases. Much information on vagrants has accumulated since 1964, but for many species are inadequate for analysis. This is especially true because observers are often unable to determine age and sex data essential for sound interpretations.

In spring, most vagrants are seen between mid-May and mid-June, which probably conforms to their actual pattern of occurrence. The fall

period is more prolonged and begins in mid-August. The time of maximum abundance is not clear; there are many more records and some vagrants attempt to overwinter.

Seasonal patterns of distribution are variable but form a continuum: some species occur almost exclusively in fall (Black-throated Blue Warbler); others occur about equally in the two seasons (Magnolia Warbler, Ovenbird); and some are primarily found in spring (Parula Warbler). No species with more than ten records has been found exclusively in spring.

The most important factor determining whether vagrants will occur at an oasis is the amount of habitat (perhaps more exactly, the distance at which the "target" can be perceived by a migrating bird). The character of the vegetation may also be important, but a choice of habitats is rarely available.

Binford (1971) suggested that vagrants may be common near the bases of mountain ranges, which form barriers to birds moving westward (see also DeBenedictis, 1971). However, some vagrants (e.g., Blackpoll, McCaskie, 1970d) are common along the coast but rare in the deserts, for reasons still undetermined. At present information is inadequate to demonstrate geographic variation in the distribution of vagrants within the desert.

Despite the great interest in vagrant birds, and the detailed analyses of their occurrence, no evidence yet presented indicates the presence of any regular routes through the desert.

VII. SUMMARY AND CONCLUSIONS

Most of the data examined in this study were not accumulated to solve problems of distribution or movements. Accordingly, it is not surprising that, even taken in toto, their applicability is limited. Some replicate distributional data, however, are of extreme value, and these are summarized in Section V.

Movements of non-passerine birds (mainly waterbirds)--Baseline data are adequate for understanding broad-scale movements of non-passerines across the deserts. These birds tend to be large and strong, and adapted for long, non-stop migrations, which are accomplished without regard for conditions in

the underlying terrain; they land only when forced down by severe weather or attracted by the presence of seasonal ponds. There is little evidence that these birds follow precise routes, though the leading-line effect of the Salton Sea and several mountain ranges doubtless provide them with landmarks for navigation. Some are known to cross through mountain passes.

Some species of waterbirds (Arctic Loon, Surfbird) which are common in the Gulf of California in spring apparently avoid a trans-desert crossing by flying westward across the mountains of Baja California to the coast.

In the eastern United States, hawks migrate along ridges, taking advantage of the updrafts and favorable soaring conditions there. No such patterns are known from the deserts. However, a trans-desert route for vultures has been mapped. Presumably hawks cross on a broader front, dropping into oases to feed, then moving on. However, the possibility that spring migrants follow the Chocolate Mt. - Little San Bernardino Mountains northward is worth investigating.

Movements of landbirds (mainly passeriformes)--Many if not most passerines are nocturnal migrants. Lowery (1951) concluded that "quantitative and directional studies have so far failed to prove that nocturnal migrants follow narrow, topographically-determined flight lanes to an important degree." His conclusions are supported by radar studies and other evidence.

In this case we, too, found no evidence that migrating landbirds follow any specific paths across the desert in spring or in fall. At dawn migrants seek out favorable areas and drop in. Most species are able to fly long-distances non-stop, and a desert crossing of 700 miles is within their capability. We believe that many nocturnal migrants "caught" over the desert at dawn continue flying until reaching the mountains or other favorable habitats. This opinion is based on the sporadic occurrence of "flights" of warblers in mid-morning that have been "precipitated" by bad weather.

In spring the volume of migration through the southern deserts exceeds that in the north. The bulk of the migrants apparently funnel through the Salton Sea-Imperial Valley-Coachella Valley area, as proposed by several workers (Howell, McCaskie, Small and others).

Detailed studies of several species have revealed an additional pattern. In spring, an early wave of migrants passes W-NW across the southern desert before moving northward along the coast or through the mountains; these are presumably birds en route to breeding areas in temperate coastal localities. During a later wave, migrants occur over a broad front. At Joshua Tree National Monument, migrants are largely derived from inland rather than coastal populations (taxonomic data in Miller and Stebbins, 1964). We think that this two-phase pattern may be more general than is currently appreciated and may apply to wide-ranging species of western birds.

The variety of landbirds in fall exceeds the number recorded in spring, being augmented by vagrants from eastern North America and post-breeding wanderers from northern Mexico and elsewhere. On the other hand, the volume of trans-desert migration is lower. This is at first surprising, since fall populations include birds-of-the-year and are larger. However, environmental conditions in fall are much more extreme, and it is reasonable to expect species to 1) attempt to cross the desert non-stop, or 2) evolve migration routes that carry them around the desert. Both strategies may be employed.

The age ratio of fall migrants in the desert seems strongly skewed toward immatures. This is true of "western" species as well as vagrants. On the other hand, the proportion of adults among resident species (Miller and Stebbins, 1964) seems strongly in favor of adults. This suggests that most western birds that occur in the desert in fall do not do so as part of their regular migration but are disoriented juveniles. Landbirds that must fly across the desert in fall probably employ a non-stop flight; the alternative strategy is too dangerous. And while adults are probably more successful than immatures, even they may encounter several difficulties if forced to land.

The regular occurrence of a large variety of eastern vagrants in desert oases in late spring and fall has attracted much attention. Consequently, our information about them is relatively good. The vast majority of these vagrants are immatures, lost and disoriented. Many reach oases after exhausting flights and chances that most will long survive seem

slight (see Binford, 1971). Thus, the desert cannot be an important migratory route for vagrants in fall. Nevertheless, for those individuals that do appear, the oases are the only place they can survive long enough to replenish their reserves for a further flight. Obviously the maintenance of oases and vegetated regions is of environmental importance.

In general, we conclude that the deserts are more important to migrating birds in spring than in fall.

We have found no evidence for the existence of a specific "desert flight line" at any season.

And, we have found no evidence (and believe none exists) to suggest that migrants move from oasis to oasis in crossing the desert. Rather we believe that a rapid crossing is the only defensible evolutionary strategy.

Resident species--The movements of resident (or breeding) species are poorly known. Adaptations such as nomadism--a common strategy for unpredictable environments in other deserts--is "restricted and rather local" among North American birds (Serventy, 1971). Some (e.g., Udvardy, 1958) have even suggested that North American birds "are not specially adapted to extremely arid conditions". However, recent physiological studies have demonstrated adaptations (heat resistance, drought resistance, torpor) that permit species to thrive under desert conditions.

From these studies we can infer some aspects of movements/patterns of particular species. For example, most desert birds must drink daily, particularly in the dry season when succulent vegetation is sparse. Thus, their distribution and daily ranges are a function of distance from water. Only a few forms (owls, wrens, roadrunner) fail to have these requirements.

Knowledge of seasonal and daily drinking patterns permit planners to determine the impact of human disturbance on oases. The impact is inversely proportional to the size of the water source. Further, the disturbance of succulent food sources, or even dry foods (by packing the ground with trails) can have far reaching effects.

Some species whose food sources are unpredictable have large daily ranges; group foraging (Lesser Nighthawk, swifts) enhances food-finding. For others, the defense of a small territory, where food is available at

least during breeding, seems a better strategy. Even strong birds (e.g., Gambel's Quail) may show little movement at this season.

A general pattern requiring further documentation is for birds to disappear from nesting areas immediately after nesting (most in July or August; April for the Phainopepla). Some summer residents (Scott's Oriole, Ash-throated Flycatcher) migrate from the state. "Resident" species also disperse, but the extent of their movements is unknown. Perhaps they congregate near water sources in the heat of the summer, prior to establishing territories in the following season. The degree to which desert residents are philopatric is known for only a few species, and is a major gap in our knowledge. It may be that "nomadism" is more common among North American desert birds than we realize.

The productivity of desert species appears low, as judged by the high percentage of adults in fall among the few species for which there are data. More information is needed.

While there is no direct evidence that residents disperse through the desert via oases or stands of riparian vegetation, that seems probable. Management plans should emphasize the preservation of corridors that effect dispersal.

Knowledge of the biology of resident species is the most critical gap in our understanding of movements of birds in the California deserts.

PART II.

Annotated Bibliography of the Ornithology of the California Deserts.

- A. Published material dealing specifically
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- B. Unpublished material dealing specifically
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AN ANNOTATED BIBLIOGRAPHY OF THE ORNITHOLOGY OF THE CALIFORNIA DESERTS

PART A

Published material dealing specifically with the California Desert

ABBOTT, C.G. 1931. Four hundred Black-necked Stilts. Condor 33: 38.

Approximately 400 birds in one flock, 29 August 1930, 9 mi NE Calexico.

ABBOTT, C.G. 1935. Another invasion of Wood Ibis in Southern California. Condor 37: 35-36.

Post-breeders may visit Imperial County every summer.

ABBOTT, C.G. 1940. Notes from the Salton Sea, California. Condor 42: 264-265.

Notes on specimens collected and donated to the San Diego Natural History Museum during the spring of 1940. Included were: Sandhill Crane, Little Brown Crane, Yuma Clapper Rail, Gull-billed Terns, Caspian Tern and Desert Poor-will.

ALDRICH, J.W. and A.J. DUVALL. 1958. Distribution and migration of races of the Mourning Dove. Condor 60: 108-128.

General discussion and taxonomic description. Ecological comments.

A(LLEN), J.A. 1893. Ornithology of the Death Valley expedition. Auk 10: 285-288.

A review of a U.S. Dept. Agriculture Biological survey.

AMERICAN BIRDS (see Audubon Field Notes).

AMERICAN ORNITHOLOGISTS UNION. 1957. Check-list of North American birds, fifth ed. Lord Baltimore Press, Baltimore.

Check-list of all North American birds, including ranges, distribution of all species and subspecies. Standard reference.

ANDERSON, A.H. and A. ANDERSON 1957. Life History of the Cactus Wren. Part I. Winter and prenesting behavior. Condor 59: 274-296.

Study done in Arizona. The birds show no evidence of migration or any flocking behavior.

ANTHONY, A.W. 1895. Notes from the Colorado Desert. Nidologist 3: 50-51. Includes a list of the species seen on a collecting trip.

ARVEY, M.D. 1941. A new race of Bush-tit from Southern California. Condor 43: 74-75.

Psaltirparus minimus providentialis (new subspecies) taken in the Providence Mts., San Bernardino County on 28 December 1938. Discusses it with regard to the other races.

AUDUBON FIELD NOTES (= American Birds) 1946 - present.

Seasonal reports of birds for entire U.S. and Canada. Area of interest to this report is "Southern Pacific Coast (in part)." Reports emphasize distributional data and rarities. Data mostly insufficient for analysis of movements of resident species. Important distributional data have been analyzed by major desert regions established in this study; migration data included under species accounts where relevant. Includes data on numbers of birds wintering on Salton Sea; many of the original data derived from field notes of R.G. McCaskie (presented separately). Desert areas regularly visited include Salton Sea, Death Valley, and others.

AUSTIN, G.T. 1971^o. Roadside distribution of the Common Raven in the Mojave Desert. California Birds 2: 98.

Censuses through year in Mojave desert of southern Nevada and San Bernardino County. Commonest along road in winter, least common in summer.

Density twice as high along major routes than secondary. Suggests distribution controlled by food supply. Also suggests that summer distribution is limited to areas near water. Indeed all observations within 15 mi of water in summer.

AUSTIN, G.T. 1971^b. On the occurrence of Eastern Wood Warblers in western North America. Condor 73: 455-462.

A review based largely on records in Audubon Field Notes through 1969. 90% of the records of eastern species in California made since 1960 -- obviously a result of increased field work. Species which breed west of the Rockies appear at about the same time that they migrate in eastern North America. Suggested that these regularly use the west coast as a migratory route. Species that breed east of Rockies occur 3 weeks or so later than migration dates in the east. Most of these seem to be lost vagrants. A high percentage are immature, apparently transported westward by airflows from east across SW states.

Suggested that there may be small but regular movement of some warblers across the desert in fall, and three species (American Redstart, Black-and-White Warbler, , Northern Waterthrush), "apparently use the desert flight line." However, the number of records for even common eastern species (e.g., Redstart) is very small (maximum 106) so it is unlikely that this route is really of much significance to an appreciable part of the population.

AUSTIN, G.T. 1976. Behavioral adaptations of the Verdin to the desert. Auk 93: 245-262.

- Desert resident. No information on movements.

BAILEY, Mrs. F.M. 1902. Handbook of Birds of the Western U.S. Houghton, Mifflin and Company, 512 p.

Of historical interest. No data on migration.

BAKUS, G.J. 1962. Early nesting of the Costa Hummingbird in southern California. Condor 64: 438-439.

Nest, 3 Feb. 1962 about one-half mi from Anza Borrego State Park.

BAIRD, S.F., J. CASSIN and G.N. LAWRENCE. 1858. Explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean. Pacific Railroad Reports, v.9: i-lvi, 1-1005.

Contains a great amount of technical information on California birds, including descriptions of several species. Not relevant to migration studies.

BALDA, R.P., B.C. McKNIGHT and C.D. JOHNSON. 1975. Flammulated Owl migration in the Southwestern United States. Wilson Bull. 87: 520-533.

Northern populations of this owl are migratory, and there is no evidence that they undergo torpor. Data here pertain mostly to New Mexico and Arizona. Spring dates: 16 April - 16 May; netted in riparian forest at 2400m in New Mexico. No fall dates. In Flagstaff, fall migration from 1 Sept. - 21 Oct.

In general, migrate northward at lower elevations than southward, presumably because of differences in food density.

BANCROFT, G. 1920. The Harris Hawk a breeder in California. Condor 22: 156.

Seen mating near Brawley, 30 March 1920. 3 eggs taken 3 mi W of Westmorland, 31 March 1920.

BANCROFT, G. 1929. A new Pacific race of Gulfbilled Tern. Trans. San Diego Society of Natural History 5: 283-286.

Describes a new race (Gelochelidon nilotica vanrossemi) from Salton Sea. Species breeds at that location.

BANKS, R.C. 1964. An experiment on a Flammulated Owl. Condor 66: 79.

Author unable to induce torpor in a individual captured at San Diego on 9 - 10 October. (See Johnson, N. 1963)

BANKS, R.C. 1967. Recent records of water birds in the desert. Bull. Southern Californian Academy of Sciences 66: 125-128.

Reports on the occurrence of Common Loon, Canada Goose, Black Brant, Mallard, Lesser Scaup and Surf Scoter. All from Anza Borrego Park Area, April 1966.

BANKS, R.C. and R.G. McCASKIE. 1964. Distribution and status of the Wied Crested Flycatcher in the Lower Colorado River Valley. Condor 66: 250-251.

Regular and perhaps not uncommon breeder along the Colorado River from southern Nevada to Mexican Border. Also a record from Morongo Valley, 9 June 1963.

BARLOW, C. 1897. Cooper Ornithological Club. Nidologist 4: 41-43.

The Secretary's report includes notes on birds on the Mojave Desert.

BARROWS, W.B. 1889. The English Sparrow (Passer domesticus) in North America, especially in its relations to agriculture. U.S. Dept. of Agriculture, Division of Economic Ornithology and Mammalogy. Bull. 1: 253-255.

Historical information concerning the English Sparrow in California in 1886.

BARTHOLOMEW, G.A. and T.J. CADE. 1956. Water consumption of House Finches. Condor 58: 406-412.

Distribution of the House Finch in the desert is related to the presence of surface water. Water consumption increases directly with an increase in ambient temperature. When eating succulent food, birds able to maintain a constant body weight for at least one week.

The smaller the bird the more water it drinks relative to its weight. (see also Moldenhauer, 1970)

BARTHOLOMEW, G.A. and T.J. CADE. 1957. The body temperature of the American Kestrel, Falco sparverius. Wilson Bull. 69: 149-154.

When subjected to high ambient temperatures, Sparrow Hawks increase body temperature 2° to 4° higher than normal. Panting and perhaps some cooling from the cere reduce body temperature. Carnivorous diet allows the bird to go without surface water. Sparrow Hawks confine their activities during the summer to the early morning and early evening, thus avoiding the heat of the day. In the winter they feed all day.

BARTHOLOMEW, G.A., W.R. DAWSON and E.J. O'NEILL. 1953. A field study of temperature regulation in young White Pelicans Pelecanus erythrorhynchos. Ecology 34: 554-560.

Effects of solar radiation, age and gular pouch fluttering on cloacal temperatures of nestling White Pelicans in rookery at S end of Salton Sea (1952).

BARTHOLOMEW, G.A. and W.R. DAWSON. 1953. Respiratory water loss in some birds of Southwestern United States. *Physiol. Zool.* 26: 162-166.

Experiments to determine amount of water lost through respiration over a 24 hr. period. Subjects were supplied with dry air, kept in darkness at approximately 25°C. Species used were House Finch, White-chinned Sparrow, Rufous-sided, Brown and Abert's Towhees, Mockingbird, Lesser Nighthawk, Loggerhead Shrike, California Thrasher, Screech Owl, Mourning Dove and California Quail. Concludes that the rate of water loss is proportionately greater with smaller body weight of bird.

BARTHOLOMEW, G.A. and W.R. DAWSON. 1954. Body temperature and water requirements in the Mourning Dove Zenaidura macroura marginella: *Ecology* 35: 181-187.

Experiments to determine body temperature in presence and absence of heat stress, differences in temperature between different parts of the body at various environmental temperatures, the effects of temperature on water consumption, and the effects of water deprivation on body temperature.

"The diurnal temperature cycles of doves kept at 5°C and 23°C are essentially the same. The daytime temperatures approximate 41.5°C. The nighttime temperature is about 2° lower. Even in the absence of heat stress, during the daytime dove temperatures varied over a range of several °C. When kept at 39°C, doves showed elevated body temperatures, with the relative elevation being greatest at night. When deprived of water and kept at 39°C, body temperature tended to be higher and more variable than when water was available. Short-term increases in air temperature caused increases in deep-body, skin and leg temperatures. Short-term decreases in air temperatures however caused decreases only in skin and leg temperatures. The panting threshold is reached at a body temperature of approximately 42.6°C. At 39°C doves drank 4 times as much water as at 23°C. 24 hrs. at 39°C without water caused a 15% loss in body weight. This loss was made up within a few minutes of the time at which water was made available.

The capacity of doves to endure elevated body temperatures and extensive dehydration, combined with their capacity to make up water deficits quickly and their ability to fly long distances, allow them to meet the demands of desert existence."

BARTHOLOMEW, G.A. and W.R. DAWSON. 1958. Body temperature in California and Gambel Quail. *Auk* 75: 150-156.

Noted the ability of both species to regulate their body temperature in hot environments. Tolerate body temperatures as much as 4°C in excess of their normal levels. This appears to be a major adaptation to living in hot areas.

BARTHOLOMEW, G.A. and R.E. MacMILLEN. 1961. Water economy of the California Quail and its use of sea water. Auk 78: 505-514.

"The low water requirements and the tolerance of dehydration of California Quail allow them to remain independent of surface water as long as green vegetation or insects can be found." Because the quail can tolerate dehydration, only under the most severe heat stress would the securing of water become critical. Limited mobility precludes periodic visits to distant water, thus influencing distribution of coveys.

BARTHOLOMEW, G.A., T.R. HOWELL and T.J. CADE. 1957. Torpidity in the White-throated Swift, Anna Hummingbird, and Poor-will. Condor 59: 145-155.

Laboratory studies show that these birds can go into a torpid state when temperature and food supplies are low.

BARTHOLOMEW, G.A., J.W. HUDSON and T.R. HOWELL. 1962. Body temperature, oxygen consumption, evaporative water loss, and heart rate in the Poor-will. Condor 64: 117-125.

Review of physiological adaptations to desert. Includes torpor and broad zone of thermoneutrality. Poor-will has greatest efficiency of evaporative cooling in any bird yet tested.

BECK, B.B., C.W. ENGEN and P.W. GELFAND. 1973. Behavior and activity cycles of Gambel's Quail and raptorial birds at a Sonoran Desert waterhole. Condor 75: 466-470.

Quail tended to be present at the waterhole during the times when the predators were absent and vice versa. Study done in Arizona.

BEHLE, W.H. 1942. Distribution and variation of the Horned Larks (Otocoris alpestris) of western North America. U. California Publ. Zool. 46: 205-316.

Taxonomic study of races breeding in W North America, lists specimens and makes general statements about breeding and winter ranges. O. a. lamprochroma: 1 specimen

from Olancho and 1 from the Imperial Valley in winter; O. a. utahensis: 2 specimens from Surveyor's well in Death Valley and 13 from 4 mi SSE Junction Ranch in Argus Mts. in fall; O. a. leucolaema: 1 specimen in winter from Deep Springs, specimens from Ontario, San Bernardino County and NE Baja indicate some crossing of California deserts by this form; O. a. enthymia: "several specimens taken in winter in SE California"; O. a. actia: 1 specimen from Mecca and 2 from Thermal; O. a. ammophila: "Resident in the Mojave and Amargosa deserts." Recorded localities: Olancho, Keeler*, Kelley's Well, Amargosa R.*, Emigrant Canyon (4889')*, 4 mi SSE Junction Ranch in Argus Mts., and Le Flat (15 mi N Darwin) - Inyo County. Mojave, Los Angeles Aqueduct (3100'), 5 mi W Mojave - Kern County. Fairmont in Antelope Valley*, Lancaster, Palmdale*, 5 mi E Palmdale* - Los Angeles County. Victorville*, Hesperia*, Oro Grande, Newberry Springs, Ludlow*, San Bernardino County. 20 mi E Holtville, Kane Springs, S. Shore Salton Sea - Imperial County. Asterisks indicate breeding stations. Intermediates between lamprochroma and ammophila taken in fall at Oasis and Deep Springs. O. a. leucansiptila: "Resident in the Colorado Desert from extreme SW Nevada, SE California and W Arizona to NE Baja and extreme NW Sonora." Specimens from Moreno Valley and Mecca* in Riverside, and from Echo Island in Salton Sea*, S end Salton Sea*, 20 mi E Holtville, Kane Spring*, 10 mi W Kane Spring, and Coyote Well* in Imperial. Asterisks indicate breeding stations.

BEHLE, W.H. 1950. Clines in the Yellow-Throats of western North America. Condor 52: 193-219.

Discusses variation found in the races; range maps showing breeding localities and areas of intergradation. G. t. occidentalis breeds at Olancho, Death Valley and Big Pine, G. t. scirpicola breeds in Lower Colorado River and Imperial Valleys. Palm Springs, Mecca, Bard, Vallecito, Pilot Knob.

BEHLE, W.H. 1956. A systematic review of the Mountain Chickadee. Condor 58: 51-70.

Discusses various races and areas where they intergrade; includes range maps.

P. gambelli inyoensis occurs in the Panamint Mts.

BELDING, L. 1890. Land birds of the Pacific District. California Academy of Science, Occasional Papers 2.

Historical information on birds along the Pacific coast and the interior. Not

relevant to migration studies.

BELDING, L. 1904. Explanatory. Condor 6: 74-76.

Report of finding Toxostoma crissale at Fort Mojave in May 1885. (= T. dorsale)

BENT, A.C. 1919-1968. Life histories of North American Birds. U.S. National Museum Bull. 107, 113, 121, 126, 130, 142, 146, 162, 167, 170, 174, 176, 179, 191, 195, 196, 197, 203, 211, 237.

A classic series of life histories treating all North American birds. Migration data are included but emphasize arrival and departure dates at various localities. Migration routes, if given, largely follow Lincoln (1939) and are not of sufficient detail to pertain to the desert.

BINFORD, L.C. 1971. Roadrunner captures Orchard Oriole in California. California Birds 2: 139.

24 Oct. 1971, Mesquite Spring, Death Valley, Inyo County : Rare migrant.

Also present: Mourning Dove, Starling, Savannah Sparrow, Lincoln's sparrow, Varied Thrush, Hermit Thrush, American Redstart, Fox Sparrow.

BISHOP, L.B. 1938. An apparently unrecognized race of Redwing from Utah. Trans. San Diego Society of Natural History 9: 1-4.

A. p. nevadensis occurring at Victorville, California.

BOLANDER, G.L. 1947. Notes from Death Valley, California. Condor 49: 85.

Observations on 25 species, on 3-4 Jan. 1947. Considered four important: Harris Sparrow at Furnace Creek (nearly all imm.), Starling, Wilson Snipe, and Virginia Rail.

BOND, R.M. 1939. White-winged Dove in Santa Cruz, Co., California. Condor 41: 255.

Unusual record - states nearest occurrence, 29 Palms.

BOND, R.M. 1943. Variation in Western Sparrow Hawks. Condor 45: 168-185.

Migration of races, range maps. Intergrades occur on the Colorado and Mojave deserts. List areas from which specimens were examined. Resident breeding populations in California and Arizona increased in fall by migrants from the north.

March and April find most migrants gone. Sexes seem to separate when migrating.

BRAUN, C.E. et al. 1976. Conservation committee report on effects of alteration of Sagebrush communities on the associated avifauna. Wilson Bull. 88: 165-171.

Reduction of sagebrush rangeland has effect on population sizes of species that may move through Southern Californian deserts, e.g. Brewer's Sparrow, Sage Sparrow, Sage Thrasher, among others. Sagebrush destruction may create habitats for some species (Horned Larks, Lark Sparrows) but be detrimental to others (raptor).

BRAUNER, J. 1952. Reaction of Poor-wills to light and temperature. Condor 54: 52-159.

Poor-wills do hibernate and seasonal movement must be looked at differently. Part of the population may not migrate.

BRODKORB, P. 1942. Notes on some races of the Rough-winged Swallow. Condor 44: 214-217.

Discussion of races that occur in Mexico. Specimens of S. r. serripennis taken in migration at Eagle Borax, Imperial County on 21 April. S. r. psammochrous collected in Imperial and Riverside Counties.

BROWNING, B.M. 1962. Food habits of the Mourning Dove in California. California Fish and Game 48: 91-107.

Discusses various study areas including the Imperial Valley area. Notes on crop contents of doves from each area.

CACCAMISE, D.F. 1974. Competitive relationship of the Common and Lesser Night-hawks. Condor 76: 1-20.

Chordeiles acutipennis is a desert-adapted species. "Since food and water in many of the habitats utilized by C. acutipennis are highly dispersed," the birds..."need to wander over great distances in search of these resources." Seems to forage in pairs or family groups, which enhances food finding. Distance wandered not known.

CALDER, W.A. 1966. Temperature regulation and respiration in the Roadrunner and the pigeon. Ph.D. dissertation, Duke University.

CALDER, W.A. 1968. The diurnal activity of the Roadrunner, Geococcyx californianus. Condor 70: 84-85.

Field study done on the Sonoran Desert south of Tucson, Arizona. Roadrunner reduces activity at midday when temperature is high. This reduces the demand for heat dissipation and the loss of water from evaporative cooling.

CALDER, W.A. 1968. Nest sanitation: a possible factor in the water economy of the Roadrunner. Condor 70: 279.

Ingestion of fecal sacs could help in water conservation for the adult birds. They are able to concentrate the urine in the sacs and get the water present.

CARDIFF, E.A. 1961. Two new records of birds for California and notes on species of the Imperial Valley and Salton Sea area of California. Condor 63: 183.

Includes data on Semipalmated Sandpiper, Starling, Bronzed Cowbird, Slatecolored Junco and Swamp Sparrow. Notes seasonal prevalence of bolutism affecting shorebirds at the Salton Sea.

CARDIFF, E.E. and B.E. CARDIFF. 1949. The Ovenbird and the American Redstart in Imperial Valley, California. Condor 51: 44-45.

Ovenbird collected southern end of the Salton Sea on 3 Oct. 1948. Also American Redstart.

CARDIFF, E.E. and B.E. CARDIFF. 1950^a. Late nesting record for the Abert Towhee. Condor 52: 135.

Nest and four fresh eggs, Westmorland, Imperial County, on 16 Sept. 1949.

CARDIFF, E.E. and B.E. CARDIFF. 1950^b. Nesting of the Black Phoebe in the Imperial Valley, California. Condor 52: 166.

Nests with young in vicinity of Westmoreland 11-16 April 1949.

CARDIFF, E.E. and B.E. CARDIFF. 1951 An unusual occurrence of the Saw-whet Owl. Condor 53: 154.

Collected 3 Feb. 1950 at the south end of the Salton Sea.

CARDIFF E. and B. CARDIFF. 1953^a Records of the Coues Flycatcher and Chestnut-sided Warbler in California. Condor 55: 217.

Flycatcher collected near Salton Sea, 4 Oct. 1952. Chestnut-sided Warbler near Niland, 5 Oct. 1952.

CARDIFF E. and B. CARDIFF. 1953^b Additional records for the American Redstart in the Imperial Valley of California. Condor 55: 279.

Three specimens: 15-16 May 1952 at Niland, and 13 Sept. 1952 near Westmoreland.

CARDIFF, E. and B. CARDIFF. 1954. A winter record for the Swamp Sparrow in the Imperial Valley, California. Condor 56: 54.

Specimen 1 Feb. 1953 near Niland.

CARDIFF, E.A. and A.T. Driscoll. 1972. Red-headed Woodpecker in the Imperial Valley of California. California Birds 3: 23-24.

One adult present, Niland, Imperial County, 17 July - 22 August 1971.

CARTER, FRANCES. 1937. Bird life at Twentynine Palms. Condor 39: 210-219.

Annotated list of species observed at 29 Palms 30 Dec. 1933 - 17 May 1934 and 17 Oct. 1934 - 30 May 1935. Brief mention of species seen and heard at Barker's Dam in Little San Bernardino Mts: Mourning Dove, Cliff Swallow, Tree Swallow, Say's Phoebe, Mockingbird, (Hooded?) Oriole, House Finch, Cañon Wren.

CHAMBERS, W.L.. 1921. A flight of Harris hawks. Condor 23: 65.

Sighting of a large flock (400-500 birds) near Calexico on 22 Oct. 1920. Birds were scattered over an area of about 80 acres.

CHEW, R.M. 1961. Water metabolism of desert inhabiting vertebrates. Biological Review 36: 1-31.

Review of conclusions of previous researchers regarding evaporative waterloss, water balance and temperature control, drinking, kidney function and differences in tolerance and habits among species.

CLARY, B.L. 1930. Blue-footed Booby on Salton Sea. Condor 32: 160-161.

Mecca, Riverside County, Nov. 1929.

CLARY, MR. and MRS. B.L. 1935. American Golden-eye and American Merganser on the Salton Sea. Condor 37: 80.

Golden-eye found dead on 8 Dec. 1933 at the Salton Sea and one collected on 11 Nov. 1934 at Mecca, Riverside County. On 2 and 16 Dec. 1934 the American Merganser was collected at the Salton Sea.

CLARY, B. and M. CLARY. 1936 Fall and winter records from the Coachella Valley, California. Condor 38: 89.

Mountain Chickadee: flock of "not over" twelve seen at Mecca 8 and 15 Dec. 1935, one collected; 2 seen 10 mi NW of Mecca 15 Dec. 1935. Red-breasted Nuthatch: 1 seen at Coachella 8 Oct. 1935. White-breasted Nuthatch: 1 seen at Coachella 10 Sept. 1935; 1 seen 15 Dec. 1935 10 mi NW of Mecca.

CLARY, B. and M. CLARY. 1936. Clark Nutcracker again visits Colorado Desert. Condor 38: 119.

Collected at Coachella, Riverside County, on 24 Sept. 1935.

CLARY, B. and M. CLARY. 1936. Winter records of Virginia Rail and Mountain Plover in Coachella Valley, California. Condor 38: 125.

Virginia Rail: 2 seen (1 collected) 26 Jan. 1936 near Mecca. Mountain Plover: 10 mi NW of Indio, 1 seen 17 Jan. 1936, 2 (1 collected) 22 Jan 1936, 10 Feb. 1936.

COLLINS, C.T.K. 1971. A probable Swift-cactus collision. California Birds 2: 101.

Numerous Vaux's Swifts and an occasional White-throated Swift foraging over small pond near mouth of Big Morongo Canyon Morongo Valley San Bernardino County 24 April - 6 May 1971.

COOPER, J.G. 1869. The naturalist in California. American Naturalist 3: 470-481.

Field observations from Fort Mojave, Arizona with numerous references to the birds of California.

COOKE, W.W. 1908. The migration of Flycatchers. Bird-Lore 10: 77-78.

No definite data from California deserts.

COOKE, W.W. 1909. The migration of Vireos. Bird-Lore 11: 118-120.

Spring arrival of Bell's Vireo: San Felipe Cañon - 23 March 1895,
Agua Caliente - 1 April 1886. (Localities not further specified.)

COOKE, W.W. 1909. The migration of the North American Sparrows. Bird-Lore 11: 254-260.

Brewer's Sparrow: Recorded at Borega (presumably = Borrego) Springs - 24 March 1895. Recorded at Palm Springs - 24 March 1896.

COOKE, W.W. 1910. Distribution and migration of North American shorebirds. U.S. Dept of Agriculture, Biological Survey 35: 1-100.

Excellent general discussion (for 1910), but mainly emphasizes breeding and wintering ranges and dates in migration, various localities. Very little information relevant to west coast. Example: "Individuals probably sometimes winter in California..." p. 51.

COOKE, W.W. 1912. The migration of North American Sparrows. Bird-Lore 14: 98-105.

Black-chinned Sparrow: Recorded at Johnson Cañon, Panamint Mts. 6 April 1891.

COOKE, W.W. 1912. The migration of North American Sparrows. Bird-Lore 14: 158-161.

Rose-breasted Grosbeak: Recorded at Palm Springs, 10 Sept. 1897.

COOKE, W.W. 1912. The migration of North American Sparrows. Bird-Lore 14: 218.

"Abert's Towhee is an abundant permanent resident of...the deserts of SE California..."

COOKE, W.W. 1913. The migration of North American Sparrows. Bird-Lore 15: 236-240.

Black-throated Sparrow: "Noted as arriving" in spring at San Felipe Canon 22 March 1895, Furnace Creek Ranch 22 March 1890.

COOKE, W.W. 1914. Distribution and migration of North American rails and their allies. Bull. U.S. Dept. of Agriculture 128: 1-50.

General information of occurrence. Not important.

COOKE, W.W. 1914. The migration of North American Sparrows. Bird-Lore 16: 267-268.

Lark Bunting: Recorded at Pilot Knob 6 April 1890.

COOKE, W.W. 1915. The migration of North American birds. Bird-Lore 17: 199-203.

Plumbeous Black-tailed Gnatcatcher: SE California mentioned as part of range.

COOKE, W.W. 1925. Bird migration. Bull. U.S. Dept. of Agriculture 185: 1-47.

The classic review of bird migration in the U.S., with many maps, etc.

Discusses all aspects of migration, including the evolution of migration routes. A general paper, with little of direct relevance to movements of desert birds through or across the deserts.

COOKE, W.W. 1916. The migration of North American birds. Bird-Lore 18: 97.

Lead-colored Bushtit: Providence Mts. mentioned as part of range. Verdin:

"Ranges N to SE California..."

COUES, E. 1866. From Arizona to the Pacific. Ibis, 2nd Ser. 11: 259-275.

A running account of many species of birds observed along the Colorado River and Mojave River.

COUES, E. 1878. Birds of Colorado Valley; a repository of scientific and popular information concerning North American Ornithology. Miscellaneous Publications 11, U.S. Geological Survey of the Territory of Washington, 8 v.: i-xvi, 1-807.

Contains information from previous publication with a "Bibliographical Appendix" relating to California Ornithology.

COULOMBE, H.N. 1971. Behavior and population ecology of the Burrowing Owl, Speotyto cunicularia, in the Imperial Valley of California. Condor 73: 162-176.

Distribution seems to be controlled by the suitability of burrow sites, mostly

made by Citellus or Cynomys. Good basic biology, no data on movements.

COWLES, R.B. and W.R. DAWSON. 1951. A cooling mechanism of the Texas Nighthawk. Condor 53: 19-22.

Together with gular fluttering and the insulating and reflective properties of the plumage, the nighthawk is able to remain in full sun. But because of the loss of water during gular fluttering the bird must be within flying distance of water.

CRASE, F.T. and R.W. DeHAVEN. 1972. Current breeding status of the Yellow-headed Blackbird in California. Californian Birds: 39-42.

Largest colonies found in Salton Sea region. Southward migration of this species begins in July. Colony of 300 in Coachella Valley (5 mi S Coachella), Riverside County, and 500 at Ramer Lake, Imperial County. See AFN 25(3), 24(3), 21(3) for movements, in April/early May.

CROUCH, J.E. 1943. Distribution and habitat of the Phainopepla.

Distribution map based on published records. Birds tend to be year-round residents in desert, but uncommon in summer. Feed on desert mistletoe, so largely in areas of mesquite, ironwood. Appear on coast in San Diego April-August. Crouch among first to suggest that desert birds move to foothills in summer, but did not suggest that they may nest in two places (see also W.L. Dawson). (This has since been speculated but not convincingly shown.)

DAGGETT, F. 1901. Summer observation in the southern Sierras. Condor 3: 117-119.

Reported Horned Larks at Antelope Valley in June. Also Ravens in upper end of valley, several Swainson's hawks.

DAGGETT, F.S. 1902. Winter observations on the Colorado Desert. Condor 4: 37-39.

Spent Oct 27 - Nov. 16, 1901 at Cargo Murchacho Mts. (5 mi W Yuma), Colorado Desert. Rock Wren only resident bird seen (considered common). Presence of American (Water) Pipits and White-crowned Sparrows given as evidence of "migration across desert."

A few other migrants (or winter residents) seen.

DAWSON, W.L. 1924. The birds of California. South Moulton Company, San Diego, California. 4 vol., 2122 p.

"A complete scientific and popular account." Classic work, with good data on most species. Somewhat dated.

DAWSON, W.R. 1954. Temperature regulation and water requirements of the Brown and Abert Towhees, Pipilo fuscus and Pipilo aberti. U. California Publ. Zool. 59: 81-124.

Observations in field indicate both species become inactive and resort to shade during heat of day. Abert's can tolerate heat better than Brown, also loses less water than Brown. "Because of their limited capacities for heat dissipation at high air temperatures, survival of passerine birds during very hot weather depends primarily on their ability to tolerate elevated body temperatures and on behavioral patterns which tend to minimize heat stress."

DAWSON, W.R. and G.A. BARTHOLOMEW. 1968. Temperature regulation and water economy of desert birds. In Desert Biology (G.W. Brown, ed.), Academic Press, New York, pp. 357-394.

Review of important physiological adaptations for deserts.

DeBENEDICTIS, P. and R.G. McCASKIE. 1967. Cassin's Kingbird and Plumbeous Solitary Vireo in the White Mountains of California. Condor 69: 424-425.

Cassin's Kingbird seen in spring and summer at Deep Springs (with young) and In summer at Oasis, Mono County.

Solitary Vireo was seen at Westgard Pass (adjacent area) on 14 July 1964, and In the spring in 1965.

DELAREUELLE, R.R. 1973. Clark's Nutcracker caught on Cholla cactus. Western Birds 4: 61.

On 15 Oct. 1972, Joshua Tree National Monument. Species invaded Southern California desert in 1972.

DEVILLERS, P. 1970. Identification and distribution in California of the Sphyrapicus varius group of sapsuckers. California Birds 1: 47-76.

S. ruber - "one record for Mojave and Colorado deserts." S. nuchalis -

"Winters along the lower Colorado, in the Mojave and Colorado deserts..." Period of occurrence from early Oct. to March. S. varius - specimens, 2 mi N Bard, 18 Dec. 1938 (one only).

Nuchalis is the main, almost exclusive form occurring in deserts from Oct. - March.

DICKEY, D.R. and A.J. VAN ROSSEM. 1922: An inland occurrence of the Common Tern. Condor 24: 29.

Collected in Mojave River at Victorville 22 Sept. 1921.

DICKEY, D.R. and A.J. VAN ROSSEM. 1922: Slight extension of the breeding range of the Western Lark Sparrow. Condor 24: 62.

A common breeder on the Mojave desert from Palmdale to 20 mi E; not confined to cultivated areas. Nest 5 May 1920. Many pairs seen daily 3-14 May 1920, late April - early May 1920.

DICKEY, D.R. and A.J. VAN ROSSEM. 1922. The occurrence of the Desert Horned Lark in Southern California. Condor 24: 94.

Specimens recorded of E. a. leucolaema: Inyo County - Deep Springs Valley 20 and 26 Sept. 1921, Keeler 21 Oct 1921; San Bernardino County - Victorville 25 Sept. 1921 (4 specimens), Newberry Springs 8 Dec. 1917; Los Angeles County - Palmdale 5 Jan. 1921 ("several specimens"); Riverside County - Thermal 27 Jan. 1918 Imperial County - 10 mi W of Kane Spring 15 Oct. 1921, vicinity of Fort Yuma 28 Jan 1921 (3 specimens), sand dunes of Holtville 21 March 1916.

DICKEY, D.R. and A.J. VAN ROSSEM. 1924. Notes on certain Horned Larks in California. Condor 26: 110.

E. a. enthymia specimens reported: Fort Yuma 29 Jan 1913, "shore of Salton Sea, Imperial County" 1 Feb 1913, Newberry Springs, San Bernardino County 8 Dec. 1913, Kane Spring, Imperial County 13 Jan. 1923(2).

DIXON, J.S. 1935. A Whistling Swan visits Death Valley. Condor 37: 212.

Eagle Borax works.

DIXON, K.L. and J.D. GILBERT. 1964. Altitudinal migration in the Mountain Chickadee. Condor 66: 61-64.

Adults are resident. Movements to the lowlands, if any, by juveniles. Probably better treated as post-breeding dispersal than "altitudinal migrants."

DUNN, H.H. 1902. The birds of Death Valley. Oologist 19: 129-132.

Not seen.

DUNN, J. and P. UNITT. 1977. A Laysan Albatross in interior Southern California. Western Birds 8: 27-28.

5 May 1976, Riverside County, base of Morongo Pass. Accidental.

A few Procellariiformes and Pelecaniformes have been detected in SE California, mainly along Salton Sea and LCR valley. "There appears to be an effect in which birds moving northward out of the Gulf of California are funnelled through the Salton Sea, the Coachella Valley and San Geronio Pass.

Apparently birds "trapped" in the desert continue to move northward along the mountains, and eventually cross over to the Pacific Ocean."

ELDER, J.B. 1956. Watering patterns of some desert game animals. J. Wildlife Management 20: 368-378.

(Not seen.)

EMLEN, J.T. 1943. Sex ratios in wintering Gambel White-crowned sparrows. Condor 45: 196.

Data indicate a partial segregation of the sexes winter. Females predominate on E side of the Sierra Nevada, including Mojave desert of California.

ESTERLY, C.O. 1920. Clarke Nutcracker on the Colorado desert. Condor 22: 40.

Reported from Coachella (no precise date); about a dozen seen. "Invasion" In Oct. 1919 near Palm Springs.

FISH, W.R. 1950. A record of the Black-and White Warbler in Eastern California. Condor 52: 94.

Near Inyokern 21 May 1949.

FISH, W.R. 1950. Nesting record of the Vermilion Flycatcher in the northern Mojave Desert. Condor 52: 137-138.

Nesting in late May 1949 at Indian Wells Valley, Kern County. Extends breeding range 100 mi to the north.

FISHER, A.K. 1893. Report on the ornithology of the Death Valley expedition of 1891, comprising notes on the birds observed in Southern California, Southern Nevada and parts of Arizona and Utah. North American Fauna 7: 7-158.

List of species and brief remarks on status.

FORTINER, J.C. 1920. Winter nesting of the Ground Dove. Condor 22: 154-155.

At Brawley: Rare spring visitor since 1912. Nests found 21 Dec. 1919. 22 Jan. 1920 (1 young), 2 eggs in same nest 15 Feb 1920.

FORTINER, J.C. 1920. Clark Nutcracker and White-winged Dove in Southern California. Condor 22: 190.

White-winged Dove: One pair seen at Brawley 4 May - 12 June, nesting.

FORTINER, J.C. 1921. The doves of Imperial County, California. Condor 23: 168.

Notes on nesting seasons of Mourning, Ground and White-winged Doves. Mourning Dove nest and eggs were found Jan., Feb., May - Sept.; Ground Dove - Jan., Feb., April - June, Aug, Sept, and Nov.; White-winged Dove - May.

FRIEDMANN, H. 1947. Geographic variations of the Black-bellied, Fulvous, and White-faced Tree-ducks. Condor 49: 189-195.

D. b. helva breeds in parts of Imperial County in fresh water marshes.

[GARLOUGH, F.E.] 1922. Blackbirds damage grain in Imperial Valley. California Fish and Game 8: 45.

Report on destruction of crops. Problem augmented by additional migrant birds from the Great Basin which winter in the Imperial Valley.

GILMAN, M.F. 1902. The Crissal Thrasher in California. Condor 4: 15-16.

Quite common in portions of the Colorado desert... near the Salton Sink,

Coachella Valley, Indio, Thermal, Walten and Palm Springs. Specimens taken at Palm Springs in Jan. 1899. Fresh eggs found at Toros and Martinez in March 1901 along with nest and eggs of Abert Towhee; Leconte Thrasher also present.

GILMAN, M.F. 1902. Notes on the Verdin. Condor 4: 88-89.

Verdin observations at Whitewater Ranch March - Oct. 1889. Fresh eggs found 20 March - 2 May; most eggs found last week of March. Birds present in Oct. Males and females building winter nest.

GILMAN, M.F. 1903. Nesting of the Abert Towhee. Condor 5: 12-13.

Common at Palm Springs; nests found 9 May 1889 and 24 March 1901; appear to be at western limit of range. Several nests also found at Toros and Martinez (April - 22 May 1902).

GILMAN, M.F. 1903. The Phainopepla. Condor 5: 42-43.

Nests found at Palm Springs 24 March 1897 and 20 March 1899 and at Toros 19 March 1901; nest building begins in late Feb., most young hatch in March and April. A few winter at Palm Springs. Nest in San Gorgonio Pass in June and July.

GILMAN, M.F. 1904. LeConte Thrasher. Condor 6: 95-98.

Nest building at Palm Springs 1899 - 1902, ranged from 17 Feb. to 4 June. 4 nests found in Feb., 1 in March, 14 in April, 5 in May, 1 in June. Banning at western limit of range.

GILMAN, M.F. 1907. Migration and nesting of the Sage Thrasher. Condor 9: 42-44.

Usually appear at Palm Springs in mid-Jan; came in from a SE direction. May nest some part of the Mojave Desert.

GILMAN, F. 1907. The Gambel Partridge in California. Condor 9: 148-149.

Discussed distribution in California including the Salton Sink area, Palm Springs, NW Colorado Desert and Whitewater. Found among LeConte's Thrashers and Abert Towhees.

GILMAN, M.F. 1918. [Minutes of] San Bernardino chapter [of Cooper Club]. Condor 20: 147.

185 ducks, 5 American Coots, 2 Common Gallinules, 4 Eared Grebes, 2 Killdeer, and 1 small sandpiper found dead along 330 ft. stretch of Salton Sea shore. No data.

GILMAN, M.F. 1935. Notes on birds in Death Valley. Condor 37: 238-242.

Annotated list of species observed in Death Valley 23 Oct. 1933 - 9 May 1934; localities primarily mentioned are Furnace Creek Ranch and Eagle Borax works. (see checklist)

GILMAN, M.F. 1936. Additional bird records from Death Valley. Condor 38: 40-41.

Reports records of 16 species seen in Death Valley at or near Furnace Creek Ranch 1 July - 14 Nov. 1935. (see checklist)

GILMAN, M.F. 1937. Death Valley bird notes for 1936. Condor 39: 90-91.

Reports records of several species observed in Death Valley, mostly at or near Furnace Creek Ranch in 1936. (see checklist)

GOULD, P.J. 1957. Specimen of Parula Warbler from Southern California. Condor 59: 210.

One collected 29 April 1956 at 1000 Palms from a flock of migrating Yellow, Audubon, Townsend, MacGillivray and Wilson's warblers.

GRANT, G.S. and N. HOGG. 1976. Behavior of late-nesting Black Skimmers at Salton Sea, California.

First found nesting in 1972; 8 nests in 1975.

Present in area until 13 Oct. Colony presumably derived from colonies in Sonora/Sinaloa.

GREENE, E.R. 1954. Scott Oriole wintering at Palm Springs, California. Condor 56: 163.

30 Dec. 1953.

GRINNELL, J. 1901. Midwinter birds at Barstow. Condor 3: 70-71.

13 species (see checklist) recorded 6 Jan 1901 on Mojave River. Verdins common, old nests seen. Other species mainly rare winter visitors.

GRINNELL, J. 1903. Check-list of California birds. Pacific Coast Avifauna #3.
Checklist, no distributional data.

GRINNELL, J. 1904. Mid-winter birds of Palm Springs, California. Condor 6: 40-45.
Brief description of area around "small village called Palm Springs" 25 Dec. - 2 Jan. 1904. Birds "exceedingly scarce" except in certain small areas. Suggest it as a good place to study migration of land birds because of peculiar topography. (see checklist)

GRINNELL, J. 1907. The California distribution of the Roadrunner (Geococcyx californianus). Condor 9: 51-53.

Discusses occurrences on the railroads; distribution map with recorded sites of occurrence.

GRINNELL, J. 1908. Birds of a voyage on Salton Sea. Condor 10: 185-191.

Notes on the breeding of White Pelicans and Double-crested Cormorant on Echo Island and Pelican Island. (see checklist)

GRINNELL, J. 1908. Goonies of the desert. Condor 10: 92.

Observations on Common Ravens following trains across the desert between California and Arizona for scraps of food thrown out.

GRINNELL, J. 1909. Bibliography of California Ornithology, First Installment. Pacific Coast Avifauna #5.

Thorough (and probably complete) list of publications dealing with California Ornithology. Covers 1797 - 1907.

GRINNELL, J. 1912. A systematic list of the birds of California. Pacific Coast Avifauna #8.

Merely a list, no distributional or migrational data.

GRINNELL, J. 1912. February bird notes from Palm Springs. Condor 14: 154.

Species seen 9-13 Feb. 1912: 1 Prairie Falcon, Screech Owl, Costa's Hummingbird, Common Raven, American Goldfinch, Abert's Towhee (abundant), 2 Townsend's Solitaire.

GRINNELL, J. 1915. A distributional list of the birds of California. Pacific Coast Avifauna #11: 217 p.

The definitive state list of the time. Many locality records and original citations. No information on dates or migration. A good guide to the early literature.

GRINNELL, J. 1918. The subspecies of the Mountain Chickadee. U. California Publ. Zool. 17: 505-515.

Discusses races of Mountain Chickadee and describes a new subspecies, Inyonensis, from Panamint, Clark Mts. Range map included.

GRINNELL, J. 1918. Seven new or noteworthy birds from E-central California. Condor 20: 86-90.

Reports on specimens and observations of Pygmy Owl, Hairy Woodpecker, Broad-tailed Hummingbird, Chestnut-collared Longspur, Rufous-sided Towhee, White-breasted Nuthatch, and Hermit Thrush in the Panamint and White Mts., 1 June - 7 Oct. 1917.

GRINNELL, J. 1919. The English sparrow has arrived in Death Valley: an experiment in nature. American Naturalist 53: 468-472.

GRINNELL, J. 1923. Observations upon the bird life of Death Valley. California Academy of Sci. Proc., Series 4, 13: 43-109.

Lists 124 species seen April and May (two trips) 1917 and 1920. 25 species are vagrants, 45 are regular transients, 32 are winter visitants, 10 are summer visitants, 9 breed in adjacent territory. Only 12 permanent residents. (see checklist)

GRINNELL, J. 1924. Bibliography of California Ornithology. Second installment. To end of 1923. Pacific Coast Avifauna #16.

Thorough annotated list of publications pertaining to California.

GRINNELL, J. 1925. The California State bird list at the end of 1924. Condor 27: 76-77.

Corrections and additions to the California list 1922 - 1924. References to previously published information only; no new data from California deserts.

GRINNELL, J. 1928. A new race of Screech Owl from California. Auk 45: 213-215.

Original description of Otus asio inyoensis from a specimen collected 13 Oct. 1927 at Independence, Inyo County; also collected 29 Sept. 1917 in Panamint Mts.

GRINNELL, J. 1933. The LeConte Thrashers of the San Joaquin. Condor 35: 107-114.

Distribution and nesting in San Joaquin Valley; only information from California desert area is a map of record localities in Kern and Los Angeles Counties.

GRINNELL, J. 1934. Further observations upon the bird life of Death Valley. Condor 36: 67-72.

Reports on species seen in below-sea level portion of Death Valley, primarily at Furnace Creek Ranch 13-30 Oct. 1933.

GRINNELL, J. 1939. Bibliography of California Ornithology. Third Installment (to end of 1938). Pacific Coast Avifauna #26: 235 p.

Thorough, briefly annotated list of publications pertaining to California.

GRINNELL, J. and A.H. MILLER. 1944. The distribution of the birds of California. Pacific Coast Avifauna #27.

The definitive book on the birds of the state, giving data on status, geographic range and localities, a complete bibliography and notes on habitat. Few specifics on migration.

GULLION, G.W. 1960. The ecology of Gambel's Quail in Nevada and the arid southwest. Ecology 41: 518-536.

Survey of the distribution of Gambel's Quail in relationship to vegetation and physical characteristics of the environment. Concludes that the "species has

a limited tolerance for the plant life-forms constituting its environment [but] it will tolerate a rather wide range of variation in its physical environment (such as altitude, temperature, and growing season), so long as the area is one of deficient moisture." Populations in valley habitats (Prosopis, Atriplex, Tamarix, Lycium) are fairly stable; those in upland habitats (Acacia, Larrea, Lycium, Rhus, Yucca, Franseria, Opuntia) may fluctuate drastically. Water needs can usually be met by insects and succulent vegetation, but occasionally drinking water may be necessary. No information on movements or dispersal.

GULLION, G.W. 1960. The migratory status of some western desert birds. Auk 77: 94-95.

Few species of Neotropical migrants breed in western deserts, apparently because there are no striking seasonal changes in vegetation. Comments on nesting requirements for some desert species.

GULLION, G.W. 1962. Organization and movements of coveys of a Gambel Quail population. Condor 64: 402-415.

Species monogamous in breeding season, but coveys remain in loose association at that time. Home ranges of coveys ranges from 19-95 acres in midwinter. Movement erratic in winter, some coveys fairly stationary, some flexible and lost from further contact. Coveys generally sedentary in January, but begin prenesting shuffle in late Jan. - late March and May; shift as much as 1/3 mi, evidently searching for nest sites. No evidence of any covey moving "any considerable distance." Movement stopped in April, when nesting started. Adult coveys and brood coveys move at different rates.

Daily movements are small; the few data indicate 400-1250 ft.

Hunter recoveries showed banded birds up to 6 mi distant, but this was rare.

Winter coveys based on associations developed after nesting season. Birds may be nomadic in fall, but this may depend on success of breeding season (e.g. population pressure). In general, a highly sedentary species.

Important paper.

Study done in Utah.

GULLION, G.W. and A.M. GULLION. 1964. Water economy of Gambel Quail. Condor 66:

32-40.

Species can maintain normal weight without drinking water if succulent vegetation and insects are available. Where this type of food is lacking and they feed on dry seed, drinking water is necessary, especially in summer, when environmental temperatures exceed body temperatures. Study conducted on captive quail.

HANNA, W.C. 1929. Vermilion Flycatcher breeding in Coachella, California. Condor 31: 75.

Nest (3 eggs) 15 April 1928, Coachella, Riverside.

HANNA, W.C. 1930. Southerly breeding record of Sage Thrasher in California. Condor 32: 263.

2 nests found 27 April (5 eggs) and 4 May (5 young) on Mojave Desert south of Victorville at 3400 ft. elevation.

HANNA, W.C. 1933. Early nesting of the Leconte Thrasher. Condor 35: 74-75.

Nest (3 eggs) in cholla "on the open desert," Coachella Valley (no exact locality) 31 Jan. 1932.

HANNA, W.C. 1933. Nesting of the Crissal Thrasher in Coachella Valley, California. Condor 35: 79.

3 nests (eggs, young) found in Coachella Valley (no exact locality) 12 Feb. 1933.

HANNA, W.C. 1935. Vermilion Flycatcher increasing in Coachella Valley, California. Condor 37: 173.

Reported as "not uncommon," having seen "over a dozen within a few hours on several occasions." "Several" fledglings seen 25 March 1934 and nest with 2 eggs found 3 March 1935.

HANNA, W.C. 1936. Large set of California Jays. Condor 38: 39-40.

Nest (6 eggs) found "on the Mojave Desert, about 40 mi from Colton." (no date)

HANNA, W.C. 1936. Vermilion Flycatcher a victim of the Dwarf Cowbird in California.

Condor 38: 174.

Reported for Coachella Valley, Riverside County.

HANNA, W.C. 1936. California Thrasher nesting on the Mojave Desert. Condor 38: 220.

Nest (3 eggs) 3 May 1936 "on the Mojave Desert about half way between Summit and Hesperia."

HANNA, W.C. 1936. Pasadena Screech Owl and Desert Sparrow Hawk in the same nest. Condor 38: 250.

5 May 1935, Mojave Desert, N of the San Bernardino Mts. The owl had taken over the kestrel's nest.

HANNA, W.C. 1937. A record nesting date for Leconte's Thrasher. Oologist 54: 45.
Nest and eggs found 24 Jan. between Indio and Palm Springs.

HANNA, W.C. 1940. Desert Sparrow Hawk and Pasadena Screech Owl in the same nest. Condor 42: 218.

In mid-April 1939, Mojave Desert. Kestrel took over the owl nest.

HANNA, W.C. 1940. Lark Bunting in Riverside and San Bernardino Counties, California. Condor 42, 265.

Flock seen 3 March 1940, between Amboy and Ludlow, San Bernardino County.
States that there were more females than males.

HANNA W.C. and E.E. CARDIFF. 1947. Cerulean Warbler in California. Condor 49: 245.
Immature female, Salton Sea, 1 Oct. 1947.

HARPER, H.T., B.H. HARRY and W.D. BAILEY. 1958. The Chukar Partridge in California. California Fish and Game 44: 5-50.

Discusses introduction and management of the Chukar in California. Includes range map. Most successful in semiarid regions.

HAWBECKER, A.C. 1942. A life history study of the White-tailed Kite. Condor 44: 267-276.

Refers to Van Rossem's observation of a Kite near Victorville (Condor 25: 140).

HAWBECKER, A.C. 1948. Analysis of variation in western races of the White-breasted Nuthatch. Condor 50: 26-39.

Discusses the four races that occur in the western U.S. Sitta c. tenuissima type collected from the Panamint Mts., Inyo County. Range maps included.

HELLER, E. 1901. Notes on some little known birds of Southern California. Condor 3: 100.

Brief notes on desert birds seen at Warren's Well, Whitewater, Mojave Desert, May 1896. Gambel's Quail, Leconte's Thrasher (commoner than Bendire's), White-winged Dove - 29 Palms, Ladder-backed Woodpecker (common).

HENSHAW, H.W. 1875. Report upon the ornithological collections made in portions of Nevada, Utah, California, Colorado, New Mexico and Arizona during the years 1871, 1872, 1873, and 1874. H.W. Henshaw, In Report Geog. and Geol. Exp. and Surv. West 100th Meridian, by G.M. Wheeler, vol. 5: 131-507, 977-989.

Of historical interest.

HENSHAW, H.W. 1878. Preliminary report on the Ornithology of portions of California and Nevada. Ann. Rep. Geog. Surv. W 100th Meridian by G.M. Wheeler. App. NN Ann. Rep. Chief of Engineers for 1878. 185-186.

Briefly mentions Barn Owl, White-crowned Sparrow, and Varied Thrush along the E border of California.

HOFFMANN, R. 1922. Field notes from Riverside and Imperial Counties, California. Condor 24: 101.

Reports "small flocks of Lark Buntings at 4 different points between Banning and Yuma," 30 in San Geronio Pass and 20 at Thermal, 3 Jan. 1922. One Lesser Yellowlegs seen 28 March 1922 near Brawley with 20 Greater Yellowlegs.

HOFFMANN, R. 1927. The Gila Woodpecker at Holtville, Imperial County, California. Condor 29: 162.

HOLLISTER, N. 1908. Birds of the region about Needles, California. Auk 25: 455-462.

Species seen 10 April - 12 June 1905 in area including Goffs, Ivanpah Valley, and New York Mt. (see checklist)

HOLTERHOFF, G., Jr. 1881. Verdin or Yellow Headed Titmouse. Orn. and Ool. 6: 27.
Reported "on the Colorado Desert." Original not seen.

HOLTERHOFF, G., Jr. 1881. Cactus Wren. Orn. and Ool. 6: 11.
"Nesting habits on Colorado Desert." Original not seen.

HOLTERHOFF, E. (=G), Jr. 1881. A collector's notes on the breeding of a few western birds. American Naturalist 15: 208-219.

Contains accounts of several species of birds from the Colorado Desert.

HOWARD, O.W. 1906. The English Sparrow in the Southwest. Condor 8: 67-68.
Noted that the House Sparrow was not found at Mojave in 1903.

HOWELL, A.B. 1922. Red-wings of the Imperial Valley, California. Condor 24: 60-6.
Abundant in cultivated areas; roosting and nesting in cottonwood trees near Calexico.

HOWELL, A.B. 1922. A winter record of the Texas Nighthawk in California. Condor 24: 97-98.

One, 23 Jan. 1922, 3 mi NW of Calexico. One Common Flicker with yellow shafts seen 22 Jan 1922 at or near Calexico; actual subspecies not determined.

HOWELL, A.B. 1923. The influence of the southwestern deserts upon the avifauna of California. Auk 40: 584-592.

Speculations on desert history, the growth of irrigated areas, and the evolution of migration routes. The major routes are along the Gila and Colorado rivers, and through the Coachella Valley.

31
HOWELL, T.R. 1952. Natural history and differentiation in the Yellow-bellied Sapsucker. Condor 54: 237-282.

Most of work done in Northern California and Canada, but included Sphyrapicus v. daggetti. Migration not extensive. March - April, Sept. - Oct.

HOWELL T.R. and G.A. BARTHOLOMEW. 1959. Further experiments on torpidity in the Poor-will. Condor 61: 180-185.

Enters torpor at 2-4°C - 19°C. May undergo prolonged hibernation as well as daily periods of torpor.

HUBBARD, J.P. 1965. Two western occurrences of the Orchard Oriole. Condor 67: 265.

One seen at El Centro, 25 March 1964.

HUEY, L.M. 1927. Observations on the spring migration of Aphriza and Gavia in the Gulf of California. Auk 44: 529-531.

Near San Felipe 16-20 April 1926 loons were observed flying in early morning (before or about sunrise) westward to the high mts., directly away from the shore line of the Gulf. Appeared to be flying shortest (but highest) route to Pacific Coast.

HUEY, L.M. 1930. A new Verdin from central Lower California, Mexico. Trans. San Diego Society of Natural History 6: 211-212.

Records A. f. flaviceps from Potholes, 3 mi N Bard, Carrizo Creek, San Diego County, and La Puerta Valley.

HUEY, L.M. 1930. Comments on the marsh sparrows of Southern and Lower California, with the description of a new race. Trans. San Diego Society of Natural History 6: 203-206.

Discusses the discovery of the nesting grounds of Passerculus s. rostratus along the lower delta of Colorado River, But states that the question of migration route for this form is still vague. Found at Mecca, Riverside County.

HUEY, L.M. 1954. Notes from Southern California and Baja California, Mexico.

Condor 56: 51-52.

Range extension for several species. Melospiza m. morphna taken 13 Oct. 1936 at Yaqui Wells.

HUNGERFORD, C.R. 1960. Adaptations shown in selection of food by Gambel Quail. Condor 64. 213-219.

In Arizona (and presumably California) species shows seasonal shift in diet, which presumably requires some shift in habitat use. Stresses importance of permanent water sources for this species.

HUNT, R. 1920. An Ovenbird on the Mojave desert. Condor 22: 190-191.

One collected 5 mi S of Lavic, San Bernardino County, 18 May 1920.

JAEGER, E.C. 1922. Denizens of the desert. The Riverside Press Cambridge, 299 p. Introduction to desert biology.

JAEGER, E.C. 1947. Use of the creosote bush by birds in the Southern California deserts. Condor 49: 126-127.

Notes on various birds of the desert using creosote bush.

JAEGER, E.C. 1947. Stone-turning habits of some birds. Condor 49: 171.

Road-runner seen turning mud plates over for crickets in Indio-Mecca area. A Cactus Wren was seen turning small stones looking for insects in a sandy wash, 21 Jan 1946 in the Chuckwalla Mts.

JAEGER, E.C. 1947. The Vermilion Flycatcher in the central Mojave Desert. Condor 49: 213.

Another "island habitat" where several pairs were nesting on 2 May 1947; also at Camp Cody Ranch (E San Bernardino County) near the Mojave River.

JAEGER, E.C. 1947. A second record of the Oven-bird on the Mojave desert. Condor 49: 244.

13 May 1947 in Granite Mts.; toward Bristol Dry Lake near Amboy.

JAEGER, E.C. 1947. White-headed Woodpecker spends winter at Palm Springs, California. Condor 49: 244-245.

From late Nov. 1916 - 25 Feb. 1916.

JAEGER, E.C. 1948a. Does the Poor-will "hibernate?" Condor 50: 45-46.

One in torpor Dec. 1946 in the Chuckwalla Mts., Colorado desert. Same bird seen again in Nov. 1947. Author feels that one of the reasons we know so little about the bird in winter is because they may "hibernate."

JAEGER, E.C. 1948b. Notes on behavior of the Turkey Vulture and Prairie Falcon. Condor 50: 90-91.

Mating Turkey Vultures at Pipes Canyon, San Bernardino Mts. (desert side) and Prairie Falcons at Negro Buttes on the southern Mojave, just N of the San Bernardino Mts.

JAEGER, E.C. 1949a. Further observation on the hibernation of the Poor-will. Condor 51: 105-109.

Studied in the Chuckwalla Mts. from 26 Nov. 1947 to 22 Feb. 1948, recording weights and temperatures. The controlling factor in hibernation of these birds seems to be food. Few insects are about when the temperature is low.

JAEGER, E.C. 1949^b. Relation of the desert Ironwood tree to nesting. Auk 66: 211-212.

Generally not used by desert birds for nesting, unless infested with mistletoe, then used by Phainopepla.

JAEGER, E.C. 1963. Aerial bathing of Ravens. Condor 65: 246.

Ravens repeatedly flying through water from irrigation system along Mojave River.

JAEGER, E.C. 1965. The California Deserts. 4th ed. Stanford U. Press, 208 p.

General introduction to desert. Some information on avian adaptations, behavior, but nothing of importance to daily/seasonal movements.

JEHL, J.R., Jr. 1968. Type specimens of birds in the San Diego Natural History Museum. Trans., San Diego Natural History Museum 15: 133-139.

Types of the following taxa taken in California desert: Callipepla (= Lophortyx gambelii deserticola) at Palm Springs, Riverside County.

Oreortyx picta eremophilus, at Lang Spring, Inyo County (Argus Mts., 6000 ft.).

Pipilo fuscus eremophilus, at Lang Spring, Inyo County (5500 ft.).

JEWETT, S.G. 1945. The Blue Goose in California. Condor 47: 167.

Seen 5-6 Feb. 1945 near the mouth of the Alamo River, Imperial County, with a flock of Snow Geese. One found dead on 11 Feb. 1945.

JOHNSON, D.H., M.D. BRYANT and A.H. MILLER. 1948. Vertebrate animals of the Providence Mountains area of California. U. California Publ. Zool. 48: 221-376.

Complete list, discussion and analysis of birds and their distributions observed and collected by Museum of Vertebrate Zoology expeditions 1917 - 1945, primarily in 1937, 1938 and 1940, in the area of San Bernardino County from 35°36' NS to 34°47', and from 115°44' WE to 115°10'. 68 permanent residents. (see checklist)

JOHNSON, F.O. 1889. Polioptila plumbea at Palm Springs, California. Auk 6: 280.

Specimens collected during later part of April. Young birds present. Also found young of Leconte's Thrasher and Gambel's Quail.

JOHNSON, N.K. 1963. The supposed migratory status of the Flammulated Owl. Wilson Bull. 75: 174-178.

Concludes that the available evidence, while not disproving migration, could mean that the species is a permanent resident on or near the breeding area in the Western U.S. and Mexico. The species may go torpid when conditions become too cold for insects to be about.

JOHNSON, N.K. 1965. Differential timing and routes of the spring migration in the Hammond Flycatcher. Condor 67: 423-437.

Important paper based on specimens. Most of the migration through the far west. Two waves of migrants pass through S Arizona. The first, with large percentage of adult males and first-year females, is thought to move W-NW or NW

through the Pacific States. A later wave is assumed to move through the interior. "It is suggested that early migrants may have evolved the coastal route in response to more favorable climatic conditions leading to better production of aerial insects there than in the Great Basin and N Mojave Desert in the early spring." Dates of passage through San Diego - S Colorado desert are late March- mid May.

Apparently very few birds reach the northern desert. So birds pass westward across Colorado desert, then northward. As with most other passerines, males migrate earlier than females, adults ahead of immatures.

JOHNSON, N.K. 1970. Fall migration and winter distribution of the Hammond Flycatcher. Bird-banding 41: 169-190.

Analysis of distribution of species in fall over its entire range; considers differences among age/sex categories. "Birds in the fall move southwardly mostly along the mountains, such as the Sierra Nevada, before crossing the Pacific slope of Southern California and the southwestern deserts."

"Area B" (comprises from Inyo, Kern Counties, N through both interior and coastal California to Mendocino County). "The immature males, adult and immature females all occur during about the same period, from late Aug. - first third of Oct. Adult males seem to move through about a week earlier...on the average, although only 6 records are at hand to document this supposition. The span of migration through area B as a whole is over seven weeks."

Area C: (S California and SW Arizona) All sex-age groups pass through this area at roughly the same period, from mid-Sept. to late Oct., hence the peak is approximately 2-3 weeks later than for Area B to the north. The span of migration through Area C is approximately seven weeks.

One winter record for California well documented: first-year male at Thermal 19 March 1921 (specimen in Chicago Natural History Museum).

JOHNSON, N.K. 1972. Breeding distribution and habitat preference of the Gray Vireo in Nevada. California Birds 3: 93-78.

In Nevada "as elsewhere on the Mojave Desert, the Gray Vireo usually occurs at low density, occupying remote slopes and canyon bottoms over a relatively narrow elevational range between 5400 and 6600 ft. ... at the lower edge of pinon...juniper... woodland." No data on dates, etc.

JOHNSON, N.K. 1973. Spring migration of the Western Flycatcher with notes on seasonal changes in sex and age ratios. Bird-banding 44: 205-220.

Analysis of distribution of subspecies in spring migration over its entire range based on specimens. Considers differences among age/sex categories.

"I feel that the relative scarcity of specimens from the N Mojave desert is a true reflection of the actual sparse density there and that the bulk of the spring movement of this subspecies [E. d. difficilis] passes closer to the continent coast, perhaps through the general area of the lower Colorado River Valley."

"The comparatively large Imperial [includes extreme NE Baja and adjacent Arizona] sample area includes numerous specimens. This fact, considered with the strategic location of this area, suggests that the great bulk of spring migrants of E. d. difficilis pass through the Imperial area after progressing NW-ward along the coast and foothills of W Mexico."

Adults predominate in Imperial and central Riverside Counties, immatures further E (in California in E San Bernardino County). Subtle differences (no major ones) probably exist in timing of migration between the sexes, but sample sizes inadequate. Adults average three to five weeks earlier than first year birds. Peak in Imperial and Riverside Counties - late in 3rd week of April. Fall migration peak 8 Sept. in Pasadena - Riverside areas; 23 Sept. in San Diego - Imperial areas.

Suggests adults tend to follow the more direct (= more coastal, through lower Colorado Desert route), more dispersal (further interior) of first-year birds.

JOHNSON, N.K. 1975. Controls on number of bird species on montane islands in the Great Basin. Evolution 29: 545-567.

Theoretical discussion of island top faunas, with some information on Panamints, and Inyo-White Mts. Ideas on invasion of areas, showing that habitat diversity is major factor affecting distribution. "Distance effect" is shown only for permanent residents. These include: Parus gambeli, Sitta carolinensis, Sitta pygmaea and several non-passerines.

JOHNSON, N.K. 1976. Breeding distribution of Nashville and Virginia's Warblers. Auk 93: 219-230.

Nashville breeds widely in higher mts. of California S along the W slope of the Sierra to Kern County. (I infer that birds pass across the desert to these areas). Virginia's Warbler breed locally in small numbers along the Nevada-

California border in several mt. areas, including Clark Mt. Migration to that area must pass over the desert, but no significant number of birds can be involved. Details of distribution are given.

JOHNSON, N.K. and K.L. GARRETT. 1974. Interior bird species expand breeding ranges into Southern California. *Western Birds* 5: 45-56.

Discussion of expansion of montane species of Great Basin or Arizona into Southern California (Whip-poor-will, Broad-tailed Hummingbird, Gray Flycatcher, Plumbeous Solitary Vireo, Virginia's Warbler, Grace's Warbler, Painted Redstart, Hepatic Tanager) including Clark Mt. Still in small numbers, and probably pass over desert in migration, but no evidence of movement within desert areas.

KOCH, F.W. 1893. Nesting of Gambel's Quail in the Colorado Desert. *Orn. and Ool.* 18: 90-91.

Not seen.

KOZLIK, F.M. 1955. Waterfowl hunting areas operated by the California Department of Fish and Game. *California Fish and Game* 41: 33-55.

Shows all areas of hunting controlled by California Fish and Game and includes lists of specimens taken from the various areas, including Imperial Waterfowl Area, with total number of species taken from 1950 - 1953.

KOZLIK, F.M., A.W. MILLER and W.C. RIENECKER. 1959. Color-marking White Geese for determining migration routes. *California Fish and Game* 45: 69-82.

Snow and Ross' Geese were marked at Tule Lake Refuge, Siskiyou County and followed. None of these birds were found in the Imperial Valley during the winter, indicating that the Imperial Valley birds migrate E of the Sierra Nevada instead of through the Central Valley.

KRUTZSCH, P. and K.L. DIXON. 1947. The White-winged Dove in San Diego County, California. *Condor* 49: 37.

Discusses range according to Grinnell and Miller (1944) and reports sight records at Yaqui Well 25 July, 1 Aug., 31 Aug. 1946; considered to be post breeding visitants to the W edge of the Colorado Desert

LACK, D. 1940. Variation in the introduced English sparrow. Condor 42: 239-241.
Mentions specimen from Southern California including San Diego, Riverside and Imperial Counties.

LAMB, C. 1911. A second occurrence of the Bohemian Waxwing in Southern California. Condor 13: 34.

One collected 13 Dec. 1910, 6 mi E of Daggett, San Bernardino County, during mild weather.

LAMB, C. 1912. Birds of a Mojave Desert oasis. Condor 14: 32-40.

Notes for a one year period in the Daggett (oasis) region. (see checklist)

LASIEWSKI, R.C. and G.A. BARTHOLOMEW. 1966. Evaporative cooling in the Poor-will and the Tawny Frogmouth. Condor 68: 253-262.

When ambient temperatures greatly exceed body temperature, the Poor-will is able to maintain thermal equilibrium by gular fluttering.

LASIEWSKI, R.C. and H.J. THOMPSON. 1966. Field observation of torpidity in the Violet-green Swallow. Condor 68: 102-103.

Observations of natural torpor at Saratoga Springs, Death Valley, suggest that temporary hypothermia may be of regular occurrence.

LAUGHLIN, J. 1947. Baikal Teal taken in California. Condor 49: 90.

Anas formosa taken at Calipatria, Imperial County on 29 Dec. 1946.

LAUGHLIN, J. 1947. Black Rail at Salton Sea, California. Condor 49: 132.

First record E of the desert divide; one taken near Calipatria on 5 Jan. 1947.

LIES, M.F. and W.H. BEHLE. 1966. Status of the White Pelican in the United States and Canada through 1964. Condor 68: 279-292.

The last breeding at the Salton Sea was in 1956 and 1957. The Sea is no longer used because of increased recreational use and the fluctuating lake levels.

LIGON, J.D. 1970. Still more responses of the Poor-will to low temperatures.

Condor 72: 496-498.

"Hibernating Poor-wills have been found only in the extreme SW portion of the U.S., where cold periods are of short duration and flying insects are irregularly available throughout the winter." Species "undoubtedly does not overwinter" in SE Idaho. "Survival value of torpor is probably greatest in spring, when returning migrants may be faced with cold and perhaps wet weather for several days..."

LINCOLN, F.C. 1924. Banding notes on the migration of the Pintail. Condor 26: 88-90.

Reports three recoveries of banded Pintails in the Central Valley. Pintail in N Kern County (in San Joaquin Valley) had been observed to arrive from the E, suggesting direct crossing of the Sierra Nevada from the Salt Lake Valley of Utah.

LINCOLN, F.C. 1927. A note on the longevity of the Pintail. Condor 29: 115.

A bird taken near Brawley was banded 12 years before in Utah.

LINCOLN, F.C. 1935. The migration of North American Birds. U.S. Dept. of Agriculture Circ. 363: 72 p., 29 fig.

Largely an up-date of Cooke's (1915) classic paper, including many of the same figures. Pages 47-49 deal with the so-called Pacific Coast route. Discussion dominated by Lincoln's ideas of the existence of "flyways."

LOWE, C.H., Jr. 1955. Gambel Quail and water supply on Tiburon Island, Sonora, Mexico. Condor 57: 244.

Quail do not require surface water during dry periods as they obtain their

needs from succulent vegetation when free water is not available.

LOWERY, G.H. 1951. A quantitative study of the nocturnal migration of birds. U. Kansas Publ. Zool. 3: 361-472.

A classic paper based on moon-watching. Techniques widely applicable, though data pertain only to E U.S.

LOWERY, G.H. and R.J. NEWMAN. 1966. A continentwide view of bird migration on 4 nights in Oct. Auk 83: 547-586.

1-5 Oct. 1952. Only local station at Lemon Grove, California.

Migration very light - general direction SW. "The distribution of W [observation] stations is too sparse to permit confident generalizations... Yet it seems fair to say that almost none of the rules that might be derived from a study of E migration... apply well in the Far West."

MACLEAN, S.F. and R.T. HOLMES. 1971. Bill lengths, wintering areas, and taxonomy of North American Dunlins, Calidris alpina. Auk 88: 893-901.

Birds wintering along the west coast of North America [and by inference Salton Sea] are referable to C. a. pacifica which breeds in W (not N) Alaska.

MACMILLEN, R.E. 1962. The minimum water requirements of Mourning Doves. Condor 64: 165-166.

Because of its wide ranging habits, the Mourning Dove is able to find surface water every few days and can survive very arid areas. It can not survive on food al

MACMILLEN, R. and C.H. TROST. 1966. Water economy and salt balance in White-winged and Inca Doves. Auk 83: 441-456.

White-winged Doves are only spring and summer residents of W deserts. Move widely. Arrival in S-Central Arizona "coincident with the ripening of berries of the wild jujube" and leave in the fall when the "last fruits of the saguaro fall to the ground." Probably need to visit water twice each day.

MACMILLEN, R.E. and J.C. SNELLING. 1966. Water economy of the White-crowned Sparrow and its use of saline water. Condor 66: 388-395.

White-crowned Sparrows occupy the desert areas only in the winter when sufficient water and succulent food are more readily available. They do not have any unique physiological adaptations to desert life.

MAILLIARD, J. and J. GRINNELL. 1905. Midwinter birds on the Mojave Desert. Condor 7: 71-77, 101-102.

Notes on the winter period of 1904-1905 near Victorville with a brief description of the area and a list of some 70 species seen. (see species list)

MANOLIS, T. 1973. The Eastern Kingbird in California. Western Birds 4: 33-44.

Suspected of nesting at Deep Springs, Inyo County. Most spring and summer records "from the Great Basin region E of the Sierra Nevada and N of the Mojave Desert." Apparently they "reach the area...by first migrating N along the E coast of Mexico from wintering grounds in South America...It seems logical to assume that most...have entered the state from the NE."

"The relative lateness of the 'spring' records also supports the theory that the birds are entering the state in a roundabout way from the E." "A very small number of Eastern Kingbirds may migrate N through the SW in the spring." Fall records for interior are from August to the first half of Sept. May be a slight movement in area, but no specific habitats; associate with Western Kingbirds.

MANOLIS, T. and G.V. TANGREN. 1975. Shorebirds of the Sacramento Valley, California. Western Birds 6: 45-54.

Availability of waste water ponds in Central Valley in recent years has attracted fair numbers of shorebirds in spring and fall. Among the commonest are Dunlin, Greater Yellowlegs, Least and Western Sandpipers, and Long-billed Dowitchers; species that winter in Southern California and beyond may move across the desert in both seasons.

MARSHALL, J.T., Jr. 1955. Hibernation in captive goatsuckers. Condor 57: 129-134.

Establishes the capacity for hibernation in the Lesser Nighthawk based on a study done in Arizona where hibernation was induced by changing the photoperiod. The birds showed an increase in body fat.

Poor-wills will go dormant when temperature drops and little food is available.

MARTIN, D.J. 1973. Selected aspects of Burrowing Owl ecology and behavior. Condor 75: 446-456.

The Burrowing Owls of California have been thought to be non-migratory (Brenckle, 1936) or partly migratory (Coulombe, 1971) with immigrants from Northern California appearing in Southern California. In New Mexico the birds are definitely migratory, leaving in Aug. - Sept. and reappearing in mid-March. Dates may also apply to California birds.

MCCASKIE, R.G. 1965. The Cattle Egret reaches the west coast of the U.S. Condor 67: 89.

Cattle Egret collected at Imperial Beach, San Diego, California, sight record reported for the Imperial Valley.

MCCASKIE, G. 1966. The occurrence of Longspurs and Snow Buntings in California. Condor 68: 597-598.

McDow's Longspur collected at Deep Springs on 16 Oct. 1949; another collected near Westmorland on 31 Jan. 1965 from a flock of Horned Larks.

Lapland Longspur, collected in Death Valley on 18 Oct. 1961 (Wauer, 1962); seen at Deep Springs on 24 Oct. 1964; collected from a flock of Horned Larks at Westmorland in Jan. 1965.

Chestnut-collared Longspur, collected at Darwin on 28 Sept. 1917 (Grinnell); Death Valley Oct. 1961 (Wauer); and seen along the Colorado River near Yuma in the months of Sept., Oct. and Nov.; seen at Westmoreland on 23 and 31 Jan. 1965 (should no longer be considered casual in California in fall and winter).

MCCASKIE, R.G. 1968. Noteworthy records of vireo in California. Condor 70: 186.

Bell's Vireo seen at Ramer Lake, Imperial County on 28 Dec. 1963 and at Parker Dam, San Bernardino County on 28 Nov. 1964.

Yellow-throated Vireo collected on 7 May 1963 at Wildrose, Death Valley National Monument.

Red-eyed Vireo seen at Deep Springs on 1 Sept. 1966 and at Laguna Dam, Imperial County on 5 June 1964.

MCCASKIE, G. 1970^a. Shorebird and waterbird use of the Salton Sea. California

Fish and Game 56: 87-95.

Annotated list of shorebirds and waterbirds of the Salton Sea (exclusive of waterfowl and Gruiformes); discussion of general seasonal and geographical distribution of birds in area.

MCCASKIE, G. 1970^b. Occurrence of the eastern species of Oporornis and Wilsonia in California. Condor 72: 373-374.

Mourning Warbler collected at Deep Springs on 12 June 1968.

Hooded Warbler seen at Deep Springs on 25 Aug. 1967 and at Borrego Springs on 24 and 28 Nov. 1967.

Canada Warbler collected in the Panamint Mts. on 13 June 1967 (only spring record).

MCCASKIE, G. 1970^c. The American Redstart in California. California Birds 1: 41-46.

Reviews status in California. Birds thought to be from E U.S. Most records from coast, but 47 fall and 20 spring records from E of the Sierra Nevada (e.g., Deep Springs, Inyo County). Concentration - late May - early June; also Sept. For Salton Sea area 17 fall, 28 winter, 9 spring records. Summary - vagrant in late spring through desert, and "Apparently a regular and normal fall migrant... along the E side of the Sierra, fanning out over the deserts of SE California."

MCCASKIE, R.G. 1970^d. The Blackpoll Warbler in California. California Birds 1: 95-104.

Common and regular vagrant along coast in fall, but only 3 records for interior. One spring record from Imperial Dam.

Rare stray from E U.S. No evidence of regular or predictable migration through desert.

MCCASKIE, G. 1970^e. The occurrence of four species of Pelecaniformes in the SW U.S. California Birds 1: 117-142.

Brown Pelican -- occurs annually in small numbers at Salton Sea and along Colorado River Valley. Virtually all records are of immatures, and most in late summer and early fall, occasionally to late Nov. on Salton Sea. Pattern is clearly one of post-breeding dispersal of birds from Gulf of California colonies.

Blue-footed Booby - regular in very small numbers at Salton Sea, and occasional in Colorado River Valley, with most records from Aug. - Sept. Post-breeding dispersal. Immatures much more frequent than adults.

Brown Booby - casual wanderer to Colorado River Valley and Salton Sea; occurs (not annually) in late summer; most records in Sept., and most of immatures.

Magnificent Frigatebird - casual on Salton Sea and Colorado River Valley; most records July - Aug., and most immatures. 7 records from Salton Sea and Colorado River Valley. Post-breeding dispersal.

Numbers vary from year to year; pelicans numerous and annual; numbers greatest when boobies also present, which suggests that presence is due to change in environment in the Gulf that drives the birds out or to favorable conditions that produce good hatches for all species.

MCCASKIE, G. 1970^f. A Red-faced Warbler reaches California. California Birds 1: 145-146.

First state record collected at Brock Experimental Ranch, 20 mi E Holtville, Imperial County, 30 May 1970. Rare vagrant from N Mexico or S Arizona.

MCCASKIE, G. 1971. Rusty Blackbirds in California and western North America. California Birds 2: 55-68.

Rare fall migrant through the Great Basin, between early Oct. and late Dec. 20 records (11 in desert area) for California, mostly in Nov. Migration period coincides with normal period in E, suggesting regular route. A few winter records. Annual in Death Valley since 1966. Most records from the interior and a few from coast, further suggesting regular route and not vagrancy. En route to unknown wintering grounds in SW. Maximum of 2 individuals at once. Strongly attracted to water, so has tendency toward oases.

MCCASKIE, G. 1971. A Pyrrhuloxia wanders west to California. California Birds 2: 99-100.

First record for state, Heise Springs Station 8 mi W Westmoreland, Imperial County, 24 Feb - 7 March 1971. Two previous reports for California. Not resident; probably largely a winter stray from S. Arizona.

MCCASKIE, G. 1973. A look at the Tree Sparrow in California. Western Birds 4: 71-76.

Occurs regularly in the Great Basin portions of E Washington, Oregon, Idaho, to S. Nevada and "it appears likely some would regularly reach E California as the birds move S through the Great Basin." Regular in small numbers in Inyo County; 16 Oct. - 22 Jan. and "all are from oasis situations." (within normal dates of migration) "The occurrence of Tree Sparrows in E California indicates the W limit of the species' normal migration route and winter range in the Great Basin."

MCCASKIE, G. 1975. LeConte's Sparrow in California and the western United States. Western Birds 6: 65-66.

Two seen at Furnace Creek Ranch, Death Valley 27 Oct. - 1 Nov. 1974. This is the only desert record for the species.

MCCASKIE, G. 1975. A Rufous-necked Sandpiper in Southern California. Western Birds 6: 111-113.

One collected on Salton Sea, Imperial County, 17 Aug. 1974. Accidental.

MCCASKIE, G. and R.R. PRATHER. 1965. The Curve-billed Thrasher in California. Condor 67: 443-444.

One seen 1 Nov. 1964 through 25 Jan. 1965 at Salton Sea National Wildlife headquarters.

Also reports previously unrecorded records for the state: fall and winter birds from Bard, Imperial County and a winter bird from Havasu Lake, San Bernardino County.

MCCASKIE, G. and E.A. CARDIFF. 1965. Notes on the distribution of the Parasitic Jaeger and some members of the Laridae in California. Condor 67: 542-544.

: Parasitic Jaeger seen on 6 Sept. 1964, at mouth of Whitewater River, 8 on 18 Sept. at the Salton Sea, 2 collected on 20 Sept. at mouth of Whitewater River.

Glaucous-winged Gull seen on 2 May 1964 at Salton Sea.

Western Gull seen on 17 Jan. 1965 at Salton Sea.

Franklin Gull. Salton Sea usually in the fall, although one bird did summer over.

Common Tern common in the fall at the Salton Sea; also seen in the summer.

Least Tern seen on 29 April 1962 at the S end of the Salton Sea, 3 at N end of the Salton Sea 27 June 1964.

MCCASKIE, G. and P. DEBENEDICTIS. 1966. Notes on the distribution of certain icterids and tanagers in California. Condor 68: 595-597.

Bobolink seen at Death Valley 25 May 1959 and at Niland on 31 July 1965.

Orchard Oriole seen at Mecca on 17 Jan. 1954 and at El Centro on 25 March 1964.

Baltimore Oriole seen at Calipatria 27-30 Nov. 1964.

Great-tailed Grackle collected near Imperial Dam on 6 June 1964; seen on 18 July 1964 at S end of Salton Sea.

Bronzed Cowbird: old records mentioned; seen at Bard in June 1963 and 1964; copulating at Laguna Dam on 2 June 1962.

Hepatic Tanager collected near Imperial Dam on 18 Nov. 1960 (from Birds of Arizona, Phillips, et al.).

MCCASKIE, R.G. and R.C. BANKS. 1966. Supplemental list of birds of San Diego County, California. Trans. San Diego Society of Natural History 14: 157-168.

Reviews status of birds in period 1959-1966, supplementing data on Sams and Stott (1959). Of interest to desert bibliography only to show that some characteristic desert residents (e.g., Bendire's Thrasher, Curve-billed Thrasher) have occurred along the coast in fall.

MCCASKIE, R.G., R. STALLCUP and P. DEBENEDICTIS. 1967. The occurrence of certain flycatchers in California. Condor 69: 85-86.

Eastern Kingbird seen at Deep Springs on 15 July 1962 and 14 July 1963.

Scissor-tailed Flycatcher collected at Death Valley on 3 May 1962 (Wauer, 1963), Indio on 25 Oct. 1948 (Tinkham, 1949).

Eastern Phoebe seen at 1000 Palms on 28 Dec. 1963.

MCCASKIE, R.G., R. STALLCUP and P. DEBENEDICTIS. 1967. The distribution of certain Mimidae in California. Condor 69: 310-311.

Catbird seen at Oasis, Mono County, and Deep Springs, Inyo County, both on 10 June 1964. Summarized data on other species which have been published in Audubon Field Notes.

MCCASKIE, R.G., R. STALLCUP and P. DEBENEDICTS. 1967. The status of certain fringillids in California. Condor 69: 426-429.

Rose-breasted Grosbeak, Deep Springs, 6 June 1965.

Indigo Bunting, Oasis, June, and at Deep Springs, June and Aug.

Dickcissel, Deep Springs, 10 June 1964.

Grasshopper Sparrow collected near Niland, 9 Nov. 1963 and seen at Westmorland on 12 Dec. 1964.

Swamp Sparrow, N end of Salton Sea, 9 May 1964, S end, 22 Feb. 1963.

MCCASKIE, G., et al. 1970. A checklist of the birds of California. California Birds 1: 4-28.

The definitive list of California birds; a basic reference.

MCCASKIE, G., S. LISTON and W.A. RAPLEY. 1974. First nesting of Black Skimmer in California. Condor 76: 337-338.

Reviews sightings at Salton Sea and elsewhere in California. Five nests found at S end Salton Sea in 1972. Species expanding its range N.

MCLEAN, D.D. 1969. Some additional records of birds in California. Condor 71: 433-434.

Desert records include: Rosy Finch seen in Nov. - both Gray-crowned and Black - at Deep Springs (10,000 in a flock) and at Panamint Springs. Tree Sparrow collected on 13 Nov. 1948 at Buckhorn Spring in Deep Springs Valley. McCown's Longspur collected on 16 Oct. 1949 at Deep Springs. Lapland Longspur same as above, also 11 Feb 1939 at Calipatria. Chestnut-collared Longspur collected in Oct. 1949 at Deep Springs.

MERRIAM, C.H. 1873. Report on the mammals and birds of the expedition. Pt. 3. Special reports on zoology and botany. Sixth Ann. Rep. U.S. Geol. Surv. Terr. by F.V. Hayden, 1873. Birds, pp. 670-704.

Of historical interest only.

MERRIAM, C.H. 1895. The Leconte Trasher, Harporhynchus lecontei. Auk 12: 54-60.

Report on Death Valley Expedition and study of the Leconte Thrasher along the way. Discusses nesting; includes range maps.

MILLER, A.H. 1930. Two new races of the Loggerhead Shrike from Western North America. Condor 32: 155-156.

Description of L. l. sonoriensis and L. l. nevadensis. L. l. sonoriensis: "Resident throughout the year from the Colorado Desert of California...E..."

L. l. nevadensis: "...from Mono County S, E of the Sierra Nevada...to the Tehachapi San Gabriel, and San Bernardino Mts. and the vicinity of Needles in the Mojave Desert

MILLER, A.H. 1940. A transition island in the Mojave Desert. Condor 42: 161-163.

Discusses area and breeding populations of Transition life zone on Clark Mt., visited in mid-May 1939 (see checklist).

MILLER, A.H. 1941. A review of centers of differentiation for birds in the western Great Basin Region. Condor 43: 257-269..

Reviews areas thought to be important in accounting for avian diversity in the Great Basin. Of importance to the present report is the Inyo area, which is "characterized by a diversity of terrain and habitat"...and includes "several mountain ranges"...as well as "desert sinks." The area encompasses most of areas 1, 2, 3, 4, and part of 5, of the present report.

10 races of birds described, of which 5 are from mts., 5 from lower elevations. These include Lophortyx californicus canfieldae, Otus asio inyoensis, Lanius ludovicianus nevadensis, Otocoris alpestris ammophila, Pipilo fuscus eremophilus, Oreortyx picta, Hylocichla guttata polionota, Parus gambeli inyoensis, Sitta carolinensis tenuissima, and Passerella iliaca canescens.

Miller argues that the White Mts. are not a center for differentiation, but the Inyo area, of which they are a part, is. These species are mostly resident, though some may show altitudinal movements. They are isolated from similar habitats and therefore have evolved racial differences. The presence of these differences is itself evidence for the limited mobility of the forms involved.

MILLER, A.H. 1941. Speciation in the avian genus Junco. U. California Publ. Zool. 44: 173-434.

Distribution and ecology of the races of the Junco group is discussed.

J. o. thurberi does not winter in large numbers E of the Sierra Nevada. Found at the bases of the mts. but rarely in the desert ranges to the E.

Hybrids between J. c. caniceps and J. o. thurberi occur in Clark Mt. and in the Argus Mts., Inyo Mts., and White Mts.

MILLER, A.H. 1946. Endemic birds of the Little San Bernardino Mountains, California. Condor 48: 75-79.

Discusses general habitat and describes three new subspecies taken in mid-Oct. 1945 at Pinyon Wells: Oreortyx p. russelli, Parus i. mohavensis, and Psaltiriparus m. sociabilis.

MILLER, A.H. 1946. Vertebrate inhabitants of the pinon association in the Death Valley region. Ecology 27: 54-60.

Occurrence of breeding and migrant species in unusually dense pinon forest in the Grapevine Mts. on the California-Nevada border. Emphasis on ecological associations.

MILLER, A.H. 1947. Arizona race of Acorn Woodpecker vagrant in California. Condor 49: 171.

Found in a small isolated area of scrub oak on 19 Oct. 1945 near summit of Eagle Mt., central Riverside County, area could not support a resident population.

MILLER, A.H. 1948. Further observations on variation in Canyon Wrens. Condor 50: 83-85.

Discusses and compares the various races, including birds from the Inyo and Mojave Desert areas.

MILLER, A.H. and L. MILLER. 1951. Geographic variation of the Screech Owls of the deserts of Western North America. Condor 53: 161-177.

Discusses variation among races and includes range maps. Describes O. a. yumanensis from 10 mi W Pilot Knob. Other races found from Clark Mt., Blythe, White Mts., and Mojave Desert.

Essentially non-migratory. Put down heavy fat deposits in fall.

MILLER, A.H. 1951. An analysis of the distribution of the birds of California. U. California Publ. Zool. 50: 531-644.

Comments on faunal associations by major life zones and on evolutionary relationships as indicated by distributional patterns. Discussion of Sonoran avifauna (pp. 595-598). Considers 9 distinctive subspecies to "focus" in the Colorado desert, 6 in Mojave.

MILLER, A.H. 1956. Additional records for the Imperial Valley and Salton Sea area of California. Condor 58: 447-448.

List of sightings from the SE end of the Sea. (see checklist)

MILLER, A.H. 1963. Desert adaptations in birds. Proc. XIII. International Ornith. Cong. 666-674.

Review some of the attributes (= "preadaptations") of birds that allow them to live in deserts. Include flight (nomadism) and high insect diet. Discussion of mortality of migrant birds passing through Joshua Tree National Monument in late Aug. - early Sept. 1950 during a period of extreme temperatures. (These data included in Miller and Stebbins, 1964).

MILLER, A.H. and R.C. STEBBINS. 1964. The lives of desert animals in Joshua Tree National Monument. U. California Press Berkeley: 452 p.

The definitive book on the park, with detailed locality records, migration summaries etc. for all species. Based mainly on MVZ field work from 1945-1951, plus other observations. Complements surveys made elsewhere in desert by MVZ staff. Dates: 12-21 May 1945, 12-24 Oct. 1945, 30 June - 16 July 1946, 21-29 April 1947, 22 Aug. - 15 Sept. 1950, 31 March - 11 April 1951, 11 - 16 Oct. 1953, 7-12 April 1960; all of these are visits by MVZ parties.

Also based on continuous observations by residents from 30 Dec. 1933 - 17 March 1934, 17 Oct. 1934 - 30 March 1935, 17-27 Jan. and 9-18 Feb. 1946 and "many other shorter trips."

Especially good because of strong taxonomic component, allowing ideas of origin of migrants.

MILLER, L.H. 1908. Louisiana Water-Thrush in California. Condor 10: 236-237.

Mecca, Riverside County, 17 Aug. 1908. Only state record.

MILLER, L. 1932. The Saw-whet Owl in the desert. Condor 34: 258.

Skeleton found 26 March 1932 in wash 3 mi upstream from Corn Spring, and one mi downstream from Aztec Well, Riverside County.

MILLER, L. 1935. Wintering hummers again. Condor 37: 177.

At Deep Canyon in Santa Rosa Mts., 30 Nov. - 1 Dec. 1934, Blue-gray Gnatcatcher "most abundant," Phainopepla and Costa's Hummingbird (3 collected) "about tied for second," Verdin next most abundant. House Finch "rare."

MILLER, L. 1946. The Elf Owl moves west. Condor 48: 284-285.

Reports on a pair seen at Cottonwood Spring, Joshua Tree National Monument on 6 May 1946. Area is a "stepping stone" for movement within the desert.

MILLER, L. 1957. Some avian flyways of western America. Wilson Bull. 69: 164-169.

"In the western U.S. some local flylines seemingly are determined by contrasting elevation and the correlated conserving of energy on the part of the bird."

Mountain passes may be a pathway of seasonal migration. Many birds observed were seen flying low over area to perhaps conserve energy. Includes map of flyways in California with discussion on the various birds seen along some of the flyways.

MILLS, G. 1976. American Kestrel sex ratios and habitat separation. Auk 93: 740-748.

Suggest winter segregation of sexes by habitat. Near El Centro, 3 Jan. 1974, 19 of 23 Kestrels seen were females mostly in agricultural fields; all 4 males seen in city. Source of birds not known, but suggest movement of residents within desert habitats.

MOFFITT, J. 1932. Clapper Rails occur on marshes of Salton Sea, California. Condor 34: 137.

3 seen and "many others" heard in tules, near Mullet Island, 10 June 1931.

MOLDENHAUER, R.R. and J.A. WIENS. 1970. The water economy of the Sage Sparrow, Amphispiza belli nevadensis. Condor 72: 265-275.

Able to maintain body weight when fed only on succulent food, but not on dry seeds. "The successful existence of Sage Sparrows in desert environments is probably dependent upon the utilization of succulent foods to satisfy their demands for water and on temperature-dependent behavioral responses which may reduce heat stress, thereby minimizing the need for evaporative cooling." (see also Bartholomew and Cade, 1956).

MOORE, C.S. 1909. A few desert species. Oologist 26: 187.

Collected eggs in Colorado desert April 1905. 19 April - Leconte's Thrasher; 20 April - Rock Wren; 24 April - Verdin; 25 April - Verdin, Leconte's Thrasher; 26 April - Cactus Wren; 28 April - Scott's Oriole.

MOORE, D.R. 1965. Breeding biology and nest usage of the Verdin in S New Mexico. Master's Thesis, New Mexico State University, Las Cruces.

Not seen.

MORCOM, G.F. 1887. Notes on the birds of Southern California and Southwestern Arizona. Ridgw. Orn. Club 2: 36-57.

Contains an annotated list of 139 species made by F. Stephens, most of which occurred in California.

NEFF, J.A. 1947. Habits, food and economic status of the Band-tailed Pigeon. North American Fauna 58.

General habitat and natural history of the bird with discussion on management of it for a game bird. Mentions one collected near Calexico; the first record from the floor of the Imperial Valley.

NORTHERN, J.R. 1968. Canada Warbler in California. Condor 70: 391.

13 June 1967 at Johnson Canyon, Panamint Mts.

NOWAK, J.H. and G. MONSON. 1965. Black Brant summering at Salton Sea. Condor 67: 357.

Black Brant were first seen on 22 April 1963 and remained until 12 Oct. Also present during the spring of 1964 and into early Sept. Wintered in the Gulf of California in 1964. Imperial Valley in direct flight line N from the head of the Gulf.

OBERHOLSER, H.C. 1923. The migration of North American Birds, second series, XXIII. Scott's Oriole and Audubon's Oriole. Bird-Lore 25: 388-389.

Scott's Oriole breeds in Southern California; winters in Mexico. Average spring arrival date on 10 April.

OBERHOLSER, H.C. 1923. The migration of North American Birds, second series, XXII. Bullock's Oriole and Hooded Orioles. Bird-Lore 25: 243-244.

Bullock's Oriole spring arrival mid-April at Tucson.

Hooded Oriole spring arrival 30 March at Tucson.

ODUM, E., C.E. CONNELL and H.L. STODDARD. 1961. Flight energy and estimated flight ranges of some migratory birds. Auk 78: 515-527.

Based mainly on E birds. Most trans Gulf. Migrants have sufficient fat reserves to make nonstop flights of 600 - 1500 mi.

ODUM, E.P., S.G. MARSHALL and T.G. MARPLES. 1965. The caloric content of migrating birds. Ecology 46: 901-904.

"Determinations of kcal per ash-free gram dry weight of 32 individuals of 20 species ranging from exceedingly fat migrants to lean non-migrant birds revealed the following: 1) Long-range migrants at peak of fat deposition in the fall had a caloric content of 7.9 - 8.3 (mean 8.1) kcal/g ash-free dry weight. 2) Spring arrivals were between 5.7 and 7.4 (mean 7.0). 3) Lean non-migrants were between 6.0 and 6.9 (mean 6.3). 4) The caloric value of the ash-free non-fat body component was the same for all three groups, averaging about 5.5, indicating that deposition and utilization of fat during migration does not affect the caloric content of the nonfat portion of the bird's body." Study conducted using TV tower kills at Tallahassee, Florida. Deals with Gulf of Mexico.

O'NEILL, E.J. 1954. Ross Goose observations. Condor 56: 311

Notes on several winter records of Ross Goose in the Salton Sea area.
Suggests an extension of wintering range.

PAIGE, B.B. 1964. The Band-tailed Pigeon in the Panamint Range of California. Condor 66: 439-440.

The isolation of the range and the plentiful supply of pinon nuts provided the birds with a good wintering area. Flocks of up to 81 birds scattered in Panamints from Nov. 1962 - April 1963.

PAYNE, R.B. 1972. Nuts, bones and a nesting of Red Crossbills in the Panamint Mountains, California. Condor 74: 485-486.

Nesting on 25 March 1970. Abundant supply of pinon pine nuts may have encouraged early nesting.

PEMBERTON, J.R. 1916. Nesting of the Leconte Thrasher. Condor 18: 219-221.

Three nests found at Cabazon and Whitewater, Riverside County, 20 April - 17 May 1916. California Thrasher also nesting at Cabazon.

PEMBERTON, J.R. 1935. Wood Ibis near Death Valley. Condor 37: 287.

One, Saratoga Springs, 8 July 1935.

PHILLIPS, A.R. 1942. Notes on the migrations of the Elf and Flammulated Screech Owls. Wilson Bull. 54: 132-136.

Study done in Arizona. These owls considered to be migratory. No winter specimens.

PHILLIPS, A.R. 1948. Survival of birds at high temperatures. American Naturalist 82: 331-334.

House Sparrows reside in areas of the SW U.S. where "lethal" temperatures continue for hours. Observes that he has never found a dead bird killed by the heat, although of captive House Sparrows exposed to continuous sun at Flagstaff, some died after 30 minutes.

PHILLIPS, A.R. 1975. The migrations of Allen and other hummingbirds. Condor 77:

Allen's Hummingbirds move N along California coast and occasionally through deserts in Jan. - March and return S to central Mexico July - Aug.; females slightly later. Apparently avoid deserts in fall. Same route taken by Rufous and Calliope Hummingbirds, though migration dates are later. Peak of Rufous and Calliope migration (males) in March.

PHILLIPS, A.R., J.R. MARSHALL and G. MONSON. 1964. The birds of Arizona. U. Arizona Press, Tucson, 212 p.

The definitive work on the state, includes data on status and migration dates of all species, important distributional maps. Strong emphasis on subspecies allows some inferences regarding broad patterns of migration. Nevertheless, the authors provide very little information on the movements of migrant or resident species. Some dates applicable to Colorado River area, Southern California deserts.

PIERCE, W.M. 1918. The Salton Sink Sparrow at Oro Grande, California. Condor 20: 126.

9 Song Sparrows taken at Oro Grande, near Victorville, 17-18 Feb. 1918:
2 fisherella, 6 cooperi, 1 saltonis.

PIERCE, W.M. 1919. Another California record of the Bendire Thrasher. Condor 21: 123.

One, 7 May 1916, near Victorville.

PIERCE, W.M. 1921. The Bendire Thrasher nesting in California. Condor 23: 34.
Eggs, 11 April 1920, near Victorville.

PIERCE, W.M. 1925. (Nesting of Leconte Thrasher, Blue-fronted Jay, Plumed Quail and Black-chinned Sparrow.) Oologists' Record 5: 80-84.

Not seen.

PITELKA, F.A. 1945. Differentiation of the Scrub Jay, Aphelocoma coerulescens, in the Great Basin and Arizona. Condor 47: 23-26.

Discusses various forms of the jays with the description of a new race, A. c. nevadae from the Panamint Mts., range map.

PITELKA, F.A. 1951. Speciation and ecologic distribution in American jays of the genus Aphelocoma. U. California Publ. Zool. 50: 195-464.

Complete taxonomic discussion. Scrub Jays reported great distances from the breeding grounds are generally first year birds - adults remain in the nesting area. Nevadae is an irregular fall migrant to lower elevations; in woodhousei the post breeding dispersal to lower elevations is more or less sporadic. Movement varies from year to year and most seems to be due to young birds.

PORTER, W.P. 1967. Solar radiation through the living body walls of vertebrates with emphasis on desert reptiles. Ecol. Monogr. 37: 273-296.

Brief mention of results of experiments indicating no light penetrates through the feather coat of House Finch and Mourning Dove.

POULSON, R.L. and G.A. BARTHOLOMEW. 1962. Salt utilization in the House Finch. Condor 64: 245-252.

Usually found in regions where surface water available. Can tolerate 0.3 M NaCl, which allows it to survive in some desert areas.

PULICH, W.M. and A.R. PHILLIPS. 1953. A possible desert flight line of the American Redstart. Condor 55: 99-100.

States that the Colorado River basin may be an incipient line of migration for the western populations of Setpohaga ruticilla.

RALPH, C.J. 1971. An age differential of migrants in coastal California. Condor 73: 243-246.

Although dealing with coastal migrants, this paper is relevant to desert studies beacuse it reviews age distribution of migrant passerines in various areas. In general, immatures tend to predominate in coastal localities, mainly because of navigational error. A much higher percentage of adults is expected in inland localities, for which data are not adequate. However, in desert areas, records of vagrants or uncommon migrants usually pertain to

immatures, again suggesting a maturational failure in navigation ability. For other data see Miller and Stebbins, 1964.

RECHNITZER, A.B. 1956. Foraging habits and local movements of the Wood Ibis in San Diego County, California. Condor 58: 427-432.

Mentions records from Daggett, San Bernardino County and Imperial County.

RICKETTS, E.D. 1928. White-winged Dove in the Imperial Valley. California Fish and Game 14: 252.

Move up Colorado River; nesting starts in latter part of April; leave in late fall. Rare N of Needles and W of Colorado River; "sometimes a few drift into Imperial County."

RICKLEFS, R.E. and F.R. HAINSWORTH. 1968. Temperature dependent behavior of the Cactus Wren. Ecology 49: 227-233.

"Field and experimental observations show that as temperatures become progressively hotter, Cactus Wrens select relatively cooler microhabitats, and that after the minimum temperature reaches a critical level of stress, activity decreases. These results lead us to conclude that insectivorous desert birds such as the Cactus Wren are true xerophiles, since they show behavioral adaptations for existence in the desert in the face of limited water intake" (abstract). Study conducted 10 mi E of Tucson, Arizona.

RIENECKER, W.C. 1965. A summary of band returns from Lesser Snow Geese of the Pacific flyway. California Fish and Game 51: 132-146.

Of 2459 Geese banded at Tule Lake and Sacramento Refuges, only 2 band recoveries were from Imperial Valley.

The Imperial Valley birds probably migrate through Montana, Utah, Nevada and Arizona and completely miss the N part of California.

RIENECKER, W.C. 1968. A summary of band recoveries from Redheads (Aythya americana) banded in NE California. California Fish and Game 54: 17-26.

Most returns of birds banded at Tule Lake were within 50 mi of their hatching site. Some were recovered in the Imperial Valley.

RIENECKER, W.C. 1976. Distribution, harvest and survival of American Wigeon banded in California. California Fish and Game 62: 141-153.

Study of birds banded in the Sacramento Valley and at the Salton Sea. The Imperial Valley population has increased over the past few years. Migration from the Sacramento Valley is to the E with most recoveries in the vicinity of the Great Salt Lake.

ROBERTSON, J. MCB. 1935. Lewis Woodpecker in Death Valley. Condor 37: 173.

"5 or 6" seen at Furnace Creek Ranch 25 Oct. 1934..

ROOT, R.B. 1962. Comments on the status of some western specimens of the American Redstart. Condor 64: 76-77.

Suggests that spring records in the San Francisco Bay area "are vagrants which have followed the coast instead of using the desert flight line..."

ROWLEY, J.S. 1928. Sage Thrasher nesting near Victorville, California. Condor 30: 325.

Nesting "in the immediate vicinity" of Victorville, San Bernardino County 22 April 1928.

ROWLEY, J.S. 1929. The Pasadena Screech Owl near Victorville, San Bernardino County, California. Condor 31: 127-128.

One male, "well developed testes," taken on 22 April 1928.

ROWLEY, J.S. 1936. Notes on some nests found in E Riverside County, California. Condor 38: 219.

Great Blue Heron, Harris' Hawk, Black-tailed Gnatcatcher.

ROYALL, W.C., Jr., et al. 1971. Migration of banded Yellow-headed Blackbirds. Condor 73: 100-106.

Insufficient numbers banded and too few recovered to determine migration through California. Breeding range of most wintering populations is unknown.

ROYALL, W.C., Jr., J.L. GUARINO, A. ZAJANC and C.C. SIEBE. 1972. Movements of Starlings banded in California. Bird-banding 43: 26-37.

Analysis of banding returns suggests some tendency to NE-SW orientation in migration. "California's winter Starling population is a mixture of permanent residents and migrants, the latter dispersing in late winter to regions N and NE of California...The Starling populations of the Central Valley and those of the Tehachapi Mts. appear to be more or less distinct."

RUSSELL, W.C. 1947. The Brown Thrasher in California. Condor 49: 131.

One, 22 Oct. 1945, Cottonwood Spring, Joshua Tree National Monument.

RYDER, R.A. 1967. Distribution, migration and mortality of the White-faced Ibis (Plegadis chihi) in North America. Bird-banding 38: 257-277.

First nested at Salton Sea NW Ref. in 1954 (5 pairs), 28 nests in 1956; none since 1961.

Individual banded as a nestling at Bear River Ref., Utah, recovered near Blythe (no date).

Several thousand wintered in the Imperial Valley as recently as the 1950's.

SABINE, W.S. 1955. The winter society of the Oregon Junco: the flock. Condor 57: 88-111.

Observations on free-living birds from 24 Oct. - 25 Jan. 1949 at Deep Springs, Inyo County and from 20 Feb. to departures in March. Notes on resident and transient populations at a feeding station. The transient populations visited the station more frequently, although the resident birds were more common on cold days.

SALT, G.W. 1952. The relation of metabolism to climate and distribution in three finches of the genus Carpodacus. Ecol. Monogr. 22: 121-152.

Experiments on oxygen consumption of Purple Finches and House Finches trapped at Berkeley and of Cassin's Finches trapped at Boca Springs under differing conditions of humidity (12% and 92-95%) and air temperature (10°-40°C). Discussion of climatic factors in relation to species' distribution.

SAMS, J. 1958. Blue Goose observed at the Salton Sea, Imperial County, California. Condor 60: 191.

One in flock of Snow Geese, 14 Dec. 1957.

SAN MIGUEL, M. 1971. A Prothonotary Warbler in Inyo County, California. California Birds 2: 95-96.

Immature male photographed at Deep Springs, Inyo County, 5 Sept. 1970.

SCHNEIDER, MRS. F.B. 1928. The season, Los Angeles Region. Bird-Lore 30: 208-209.

Pair of Inca Doves (?), Black-chinned Hummingbirds (?), flock of Sage Thrashers, and abundant Black-throated Sparrows and Verdins reported from Palm Springs in mid-Feb. 1928. Yellow-headed Blackbirds, Mountain Plover, and Sage Thrasher reported from Imperial Valley in late Feb. 1928.

SERVENTY, D.L. 1971. Biology of desert birds, In J.R. King and D.S. Farner, eds. Avian Biology, vol. 1, Academic Press, New York: 287-339.

Review of history, age of deserts and of avian adaptations to desert conditions. Discusses nomadism as an important strategy where environmental conditions are uncertain; that behavior is "restricted and rather local" in the North American deserts.

STOTT, K. and J.R. SAMS. 1959. Distributional records of the Common Goldeneye and the Crissal Thrasher in SE California. Condor 61: 298-299.

Common Goldeneye seen 6 Dec. 1958 at Brawley. Crissal Trasher seen 12 Dec 1958 on the outskirts of Borrego township; reported also from Borrego Valley and Yaqui Well.

SHEPPARD, J.M. A study of the LeConte's Trasher. California Birds 1: 85-94.

Locally distributed in California deserts including all of Mojave and Colorado deserts...

Permanent resident, nesting from late Jan. - early June; adults probably mate for life. Utilize about 100 acres over a year's period, territorial year round. No evidence of migration or movement.

SMALL, A. 1959. Recent occurrences of Oldsquaw in Southern California. Condor 61: 302-303.

Recorded at Salton Sea 22 Feb. 1948 and 16 Nov. 1950.

SMALL, A. 1974. The birds of California. Winchester Press, New York. 310 p.

An ecological/habitat view of California birdlife, including a briefly annotated list. Good overview of general migrational patterns (pp 14-18), including a discussion of how waves of migrants form in the deserts. Review of birdlife in the California Deserts (pp 220-241) and the Great Basin (242-248).

SMITH, W.A. 1968. The Band-tailed Pigeon in California. California Fish and Game 54: 4-16.

Notes on the species as occurring in the Panamint Range, Argus Range, and at Little Lake near Olancho.

SMYTH, M. and G.A. BARTHOLOMEW. 1966. The water economy of the Black-throated Sparrow and the Rock Wren. Condor 68: 447-458.

Black-throated Sparrows do not need to drink when green vegetation or insects are available, but they will drink when water is present and when they are feeding mainly on seed.

The Rock Wren does not need to drink water as enough is obtained from insect diet. Can maintain weight on water up to 0.4 M NaCl.

SMYTH, M. and H.N. COULOMBE. 1971. Notes on the use of desert springs by birds in California. Condor 73: 240-243.

At Upper Carrizo Spring, Riverside County, 1 Aug. 1964 - 30 July 1965, including "six all-day watches." Lists birds shown to drink regularly, rarely, or not at all. Suggests that diets of desert birds determine whether or not they drink. However, migrating fringillids and insectivores drank regularly.

STEPHENS, F. 1884. Collecting in the Colorado Desert - Leconte's Thrasher. Auk 1: 353-358.

Notes on a trip to "Agua Caliente," California, from 26-28 March 1884, (= Palm Springs, Riverside County). (see checklist)

STEPHENS, F. 1890. Notes on birds observed in the Colorado Desert in winter. Auk 17: 296-297.

Notes on a trip through the Borrego Desert area from 27 Dec. 1889 - early 1890. (see checklist)

STEPHENS, F. 1901. Scott's Oriole at San Diego, California. Trans. San Diego Society of Natural History 3: 94.

Scott's Oriole "is not rare on the desert slope of the mts. In San Diego County in the migrations."

STEPHENS, F. 1903. Bird notes from E California and W Arizona. Condor 5: 75-78, 100-105.

May - Aug. 1902 made trip from E end San Geronimo Pass. Crossed Colorado desert by way of Morongo Pass onto Mojave Desert (29 Palms) into Arizona. Brief description of habitat, Providence Mts. "Birds less plentiful in Colorado Valley (Aug.)," migration being practically over.

STEPHENS, F. 1919. Unusual occurrences of Bendire Thrasher, Forked-tailed Petrel and Western Goshawk. Condor 21: 87.

Bendire's Thrasher: 1 specimen from Palm Springs 8 April 1885, in San Diego Natural History Museum.

STEPHENS, F. 1920. Bohemian Waxwing in San Diego County. Condor 22: 159.

Two found dead at Vallecitos 29 March 1920.

STEVENSON, J. 1929. Hooded Merganser at Salton Sea, California. Condor 31: 127.

Dead female found "along the N end of Salton Sea near Mecca"; 27 Nov. 1928. Not preserved.

SUFFEL, G.S. 1967. An additional specimen of Coues Flycatcher in California. Condor 69: 430-431.

20 mi E of Holtville, Imperial County, 29 Sept. 1965.

SUFFEL, G.S. 1970. An Olivaceous Flycatcher in California. California Birds 1: 79-80.

Specimen 23 Nov. 1968, Furnace Creek Ranch, Death Valley.

SUMNER, E.L., Jr. 1929. Golden Eagle in Death Valley. Condor 31: 127.

Notes presence of eagle, Green-winged Teal, unidentified ducks, Killdeer, 27 Dec 1928.

SUMMER, E.L. 1935. A life history study of the California Quail, with recommendations for conservation and management. California Fish and Game 21: 167-156.

Leave roosts early in morning and feed about one hr until crop about half full, decreases until 4:00 pm when they again feed until dusk. Distance traveled for food is slight. Quail do not need drinking water if proper food is available. Generally restricted to water hole areas during hot periods.

General life history and management suggestions.

SWARTH, H.S. 1904. The status of the Southern California Cactus Wren. Condor 6: 17-19.

Mentions specimens from Colorado Desert - no dates. One male from Cahuilla Valley 15 April 1886.

SWARTH, H.S. 1914. A distributional list of the birds of Arizona. Pacific Coast Avifauna 10.

Mostly peripheral to California deserts, but includes some important distributional data for Colorado River area.

SWARTH, H.S. 1916. The Pacific Coast races of the Bewick Wren. California Acad. Sci., Proc. Series 4, 6: 53-85.

Discusses the various races. Only T. b. eremophilus "has truly migratory habits." "The birds found on the Colorado Desert during winter are apparently migrants from the desert mts. to the N..." Regarding other races, Swarth (p. 56) wrote "there has been no evidence evolved indicating regular migrations of these birds."

SWARTH, H.S. 1920. Revision of the avian genus Passerella, with special reference to the distribution and migration of the races in California. U. California Publ. Zool. 21: 75-224.

Definitive study on the Fox Sparrows. All are migratory but none of the race canescens were taken in Owens or Death Valley. Believed to fly directly over the area during migration. The subspecies that breeds the farthest N migrates the farthest S.

TAYLOR, W.K. 1971. A breeding-biology study of the Verdin, Auriparus flaviceps (Sundevall) in Arizona. American Mid. Nat. 85: 289-328.

Study on banded individuals 9 mi NE of Mesa, Maricopa County, Arizona. Distinct change in population structure observed, beginning in late May and more noticeable in late summer, of increased numbers of unbanded individuals, primarily immatures, in the study plot. Most of the banded birds had disappeared by the end of the breeding season. Individuals wintering on the area formed the major structure of the breeding population for the next year. Influx of Verdins in fall and winter was observed in the residential areas of Tempe. Of 23 adults and 27 nestlings banded on study plot in 1965 only one male remained to breed in the same area again in 1966. This individual stayed in area for 421 days; longest female stay, 148 days. Longest stay of a nestling, 136 days.

THOMPSON, B.H. 1933. History and present status of the breeding colonies of the White Pelican in the U.S. U.S. Dept. Interior, National Park Service, Occasional paper 1: 10 + 1-82.

Includes data on Salton Sea colony. Reported as early as 1908; 50 pairs, 1928-1930. Colony not considered of major importance.

THOMPSON, W.L. 1964. An early specimen of the Indigo Bunting from California. Condor 66: 445.

11 April 1908, Mecca, Riverside County.

TINKHAM, E.R. 1949. A record of the Scissor-tailed Flycatcher from the Colorado Desert. Condor 51: 99-100.

25 Oct. 1948, 8 mi W Indio, Riverside County.

TWOMEY, A.C. 1947. Critical notes on some western Song sparrows. Condor 49: 127-128.

Taxonomic remarks on saltonis and bendirei; saltonis specimens from Mecca and Bard.

UDVARDY, M.D.F. 1958. Ecological and distributional analysis of North American Birds. Condor 60: 50-66.

Recognizes 29 species as characteristic of the sagebrush and desert scrub. These are not named specifically but seem to include: Prairie Falcon, Gambel's Quail, Sage Grouse, White-winged Dove, Mourning Dove, Elf Owl, Poor-will, Lesser Nighthawk, flycatchers (3 species), White-necked Raven, Verdin, Cactus Wren, thrashers (5 species), Black-tailed Gnatcatcher, Lucy's Warbler, and fringillids (9 species).

VAN ROSSEM, A. (J.) 1911. Winter birds of the Salton Sea region. Condor 13: 129-137.

Approximately 100 species noted. Also 72 species in spring near Mecca. (see checklist)

VAN ROSSEM, A.J. 1923. The White-tailed Kite on the Mojave Desert. Condor 25: 140. Seen on Mojave River below Victorville, 17 Sept. 1922.

VAN ROSSEM, A.J. 1930. The races of Auriparus flaviceps (Sundevall). Trans. San Diego Society of Natural History 6: 199-202.

A.f. flaviceps occurring at Mecca, Riverside County, Newberry Springs, San Bernardino County, La Puerta Valley, San Diego County and Colorado River Valley N to Inyo County.

VAN ROSSEM, A.J. 1933. The Gila Woodpecker in the Imperial Valley of California. Condor 35: 74.

Two seen 21 March 1932 near Calipatria, several 14 June 1932 along highway between Brawley and El Centro, and "occasional birds" near Holtville, El Centro and Brawley, early July 1932. First noted near Calexico in 1931.

VAN ROSSEM, A.J. Notes on some types of North American birds. Trans. San Diego Society of Natural History 7: 347-362.

Holotype of Pyrocephalus rubinus flammeus taken Jan. 1913 at Brawley, Imperial County.

VAN ROSSEM, A.J. 1934. A Northwestern race of the Varied Bunting. Trans. San Diego Society of Natural History 7: 369-379.

Two specimens from Blythe, Riverside County, 8-9 Feb. 1914.

VAN ROSSEM, A.J. 1935. A new race of Brown Towhee from the Inyo region of California. Trans. San Diego Society of Natural History 8: 69-72.

Pipilo f. eremophilus described from Lang Sp. (5500 ft.), Mountain Springs Canyon, Argus Mts., Inyo County, 22 May 1935. Range, Argus Mts. of Inyo and San Bernardino Counties.

VAN ROSSEM, A.J. 1938. A Colorado Desert race of the Summer Tanager. Trans. San Diego Society of Natural History 9: 13-14.

Holotype of P. r. hueyi taken at Potholes (= Laguna Dam) May 1916. Race not recognized by AOU

VAN ROSSEM, A.J. 1942. Notes on some Mexican and California birds with description of six undescribed races. Trans. San Diego Society of Natural History 9: 377-384.

Parabuteo unicinctus superior taken at Laguna Dam, lower Colorado River, Jan. 1925.

Agelaius p. thermophilus taken 3 mi N Calexico May 1921. Occurs in Salton Sea region.

VAN ROSSEM, A.J. 1942. Four new woodpeckers from the western United States and Mexico. Condor 44: 22-26.

Centurus uropygialis albescens collected 31 Dec. 1924 at Laguna Dam, Imperial County. Also reported at Calipatria, El Centro, and Brawley.

Dryobates scalaris yumanensis taken on 25 Jan. 1913 at Laguna Dam. No longer recognized.

D. s. mojavnensis, 6 Jan. 1921, Palmdale, Los Angeles County, California. No longer recognized.

VAN ROSSEM, A.J. 1945. The eastern distributional limits of the Anna Hummingbird in winter. Condor 47: 79-80.

Records E of the coastal breeding range, mostly of young birds. Reports from White Mts., Brawley, Palm Springs, Mecca and Hesperia.

VAN ROSSEM, A.J. 1945. Preliminary studies on the Black-throated Sparrows of Baja California, Mexico. Trans. San Diego Society of Natural History 10: 237-244.

Taxonomic: includes map of breeding areas for A. b. deserticola in California.

VAN ROSSEM, A.J. 1946. Two new races of birds from the Lower Colorado River Valley. Condor 48: 80-82.

Restricted to Lower Colorado River Valley. Toxostoma d. coloradense taken on 25 Dec 1910 at Brawley. Pipilo a. dumeticolus taken 13 Oct. 1921 at Calexico.

Other localities for Toxostoma: Palm Springs, Mecca, Thermal, Indian Wells, Potholes, Bard, Laguna Dam, and Neighbors. Same for Pipilo with addition of Ft. Yuma, California.

VAN ROSSEM, A.J. 1947. A synopsis of the Savannah Sparrow of Northwestern Mexico. Condor 49: 97-107.

Discusses various races and mentions migration of several. P. s. rostratus occurs at Salton Sea; infrequently.

WALSBERG, G.E. 1975. Digestive adaptations of Phainopepla nitens associated with the eating of mistletoe berries. Condor 77: 169-174.

Common winter and spring resident in desert; feeds on mistletoe to great extent. (More recent studies suggest this species leaves desert in early summer and moves to coast.)

WAUER, R.H. 1960. Rare migrants in Death Valley National Monument, California. Condor 62: 139.

Northern Waterthrush, 10 May 1959, Panamint Mts. Bobolink, Death Valley National Monument, 25 May 1959.

WAUER, R.H. 1960. Brown Thrasher in Death Valley, California. Condor 62: 297.

One found dead near Furnace Creek Ranch, 1 Nov. 1959.

WAUER, R.H. 1962. A survey of the birds of Death Valley. Condor 64: 220-233.

Complete review includes description of area, climate records, and habitats. Also data on seasonal changes in avifauna and discussion of patterns of migrants. (see checklist)

WAUER, R.H. 1963. Scissor-tailed Flycatcher in Death Valley, California. Great Basin Nat. 23: 165.

One, 3 May 1965, Furnace Creek Ranch.

WAUER, R.H. 1964. Ecological distribution of the birds of the Panamint Mountains, California. Condor 66: 287-301.

Complete list, based on literature and author's work "at all seasons" from 1957-1962. Includes data on topographic conditions, ecological distribution by habitat. Distribution of breeding birds tabulated by altitude. Notes on use of springs by birds. 145 species. (see checklist)

WEBB, W.G. 1939. Waterfowl at Deep Springs Valley, Inyo County, California. Condor 41: 35-37.

Observations in spring of 1938. "Migration well under way about mid-March. Height of migration about 27 March." (see checklist)

WILBUR, S.R., W. D. CARRIER and G. MCCASKIE. 1971. The Lark Bunting in California. California Birds 2: 73-76.

Formerly said to occur regularly in E California, but authors question this. Consider it a rare and irregular spring and fall migrant. "There have been winters during which flocks reached as far W at the S part of the state..." Since species winters commonly in Baja California, a regular migration through the California deserts would not be unexpected.

WILBUR, S.R. 1973. The Red-shouldered Hawk in the western United States. Western Birds 4: 15-22.

"Cohen (1970) found an apparently resident population near Victorville, and the species has been reported nesting in Morongo Valley...both in San Bernardino County."

Grinnell and Miller (1944) gave no records for the SE desert. Cohen suggested that birds invaded San Bernardino after being displaced to other areas. No data on migration.

WILLETT, G. 1930. The Large-billed Sparrow at Salton Sea. Condor 32: 160.

Passerculus sandwichensis rostratus, Mecca, Riverside County, 23 Feb. 1930.

WILLETT, G. 1932. Sanderling and Turnstones at Salton Sea, California. Condor 34: 228.

Sanderling "fairly common," one Black and "four or five" Ruddy Turnstones, 17 May 1930.

WILLETT, G. 1934. The lower California Say Phoebe in SE California, Condor 36: 117.

S. s. quiescens from N Baja California, apparently wanders N in fall, 11 specimens taken near Kane Springs, 26 Nov. 1933 - 9 Jan. 1934; Coachella Valley 23 Jan. 1934.

WILLETT, G. 1951. Birds of the Southern California Deserts. Los Angeles County Museum Sci. Series 14, Zool. Publ. 6.

A popular publication on birds found in the desert regions. (see checklist)

WILLOUGHBY, E.J. 1966. Water requirements of the Ground Dove. Condor 68: 243-248.

Ground Dove depend heavily on the presence of low salinity water. Unlike the Mourning Dove their daily movements are restricted to a small area and the birds usually drink repeatedly during the day when the air temperatures are high.

WINTER, J. 1973. The California Field Ornithologists Records Committee Report 1970 - 1972. Western Birds 4: 101-106.

List of new records (accepted and unaccepted) for California. Many of these pertain to rarities in the desert areas.

WINTER, J. 1974. The distribution of the Flammulated Owl in California. Western Birds 5: 25-55.

Flammulated Owls breed in Yellow Pine areas in Mts. W of the Great Plains and winters in central America. Common in suitable habitat in California from mid-April - Oct. Presumably passes over the desert in those migrations. One breeding record from Argus Mts., Inyo County. "Migration patterns are virtually unknown

In the state." Also a breeding female taken on Clark Mt., San Bernardino County (Miller, 1940). No dependence on desert habitats in migration.

WINTER, J. and G. MCCASKIE. 1975. 1973 Reports on the California Field Ornithological records committee. Western Birds 6: 135-144.

Discusses 1973 reports of rare and accidental species, including reports for desert.

WOODS, R.S. 1927. The hummingbirds of California. Comments on their habits and characteristics. Auk 44: 297-318.

General information concerning nesting habits and young.

WOOTEN, W.A. 1952. Roseate Spoonbill in Imperial County, California. Condor 54: 208.

Five, Alamo River, Salton Sea, 30 Sept. 1951. Other reports: 1909, 1913, and 1927.

ADDENDUM

BINFORD, L.C. 1971. Northern and Louisiana Waterthrushes in California. California Birds 2: 77-92.

Northern Waterthrush is rare but regular migrant east of Sierras. Suggests that "birds wintering on the mainland of Mexico and breeding in the northwest pass regularly along a northwesterly course that takes them through northwestern Mexico." In addition, vagrants from the east drop into desert oases in fall.

Louisiana Waterthrush - only 1 record from desert.

CODY, M.L. 1968. Interspecific territoriality among hummingbird species. Condor 70: 270-271.

Several species of hummingbirds contested for bladderpods (*Isomeria arborea*) resources in March-April, near Amboy. Only one of these was resident. (Identification of some species questionable.)

DEBENEDICTIS, P. 1971. Wood warblers and vireos in California: the nature of the accidental. California Birds 2: 111-128.

Large numbers of accidentals move through the desert and are concentrated in desert; most are immatures. Probability of a species occurring is a function of its breeding range (higher in northerly species) and population size. The mountains of California form a barrier and act to concentrate birds in deserts.

DEVILLERS, P., R.G. MCCASKIE, and J.R. JEHL, JR. 1971. The distribution of certain large gulls (Larus) in southern California and Baja California. California Birds 2: 11-26.

Summarizes status and field characters. Discussion of how gulls reach the Salton Sea area.

GAINES, D. 1974. Review of the status of the Yellow-billed Cuckoo in California: Sacramento Valley population. Condor 76: 204-209.

HUBBARD, J.P. 1973. Avian evolution in the aridlands of North America.

Living Bird, 12th Annual: 155-196.

Exceptional paper dealing with biogeography and species formation of birds in the southwest deserts.

MOORE, R.T. 1939. A review of the House Finches of the subgenus Burrica. Condor 41: 177-205.

Discusses distribution of the group and compares various characters of each race. Includes range maps.

PHILLIPS, A.R. 1968. The instability of the distribution of land birds in the southwest. From Collected Papers in Honor of Lyndon Lane Hargrave. Museum of New Mexico Press, pages 129-162.

An analysis of the changes in distribution of land birds in and near Arizona with discussions on 37 species.

PHILLIPS, A.R. 1975. Why neglect the difficult? Western Birds 6: 69-86.

Emphasizes value of collecting vagrants of polytypic species to determine geographic area of origin. Many eastern subspecies occur in west.

BLACKMON, T. W. 1976. Distribution and relative densities of the band-tailed pigeon (Columba fasciata monilas) in California. Department of Fish and Game, Wildlife Management Branch Admin. Rept. No. 76-2, 35 pp.

AUSTIN, G. T. 1977. Production and survival of the Verdin. Wilson Bull. 89: 572-582. Thorough study based in Arizona and Nevada. In S. Cal. density ranges from 3-16 pr/40 ha (Mean 8). Breeding season from mid-March -mid-June; up to 4 clutches laid in some areas. Peak of breeding season shorter in Mojave region than elsewhere, due to lack of distinct rainy season. Good data on survival rates. Adult; young ratio drops to 3:2 in November. Annual mortality for young is 75%, for adults 40%.

Watkins, T. J. 1976. Turkey vulture migrations in the Mojave Desert of California. Unpub. M.S. thesis, Cal. State Polytechnic Inst., Pomona. 35 p. Maps and quantifies movements across desert in spring and fall. A regular route travelled in fall and to a much lesser extent in spring. Flights are largely confined to a short period (ca. 20 days) in each season. The route has been mapped for over 250 miles of desert. Interestingly, there is no evidence that hawks follow this route, which is to be largely along the Mojave River. Infers that this is due to historical reasons; i.e. presence of trees for roosting. Vultures travel about 200 miles per day, do not feed in fall migration.

PART B

Unpublished materials dealing specifically with the California Deserts,
including field notes, museum holdings, raptor surveys,
breeding bird censuses, etc.

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- II Field notes of individuals
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I Museum Holdings

BUREAU OF LAND MANAGEMENT, Riverside, California.

List of scientific specimens of birds collected in California deserts.

Approximately 226 pages. Includes data on specimens in San Diego Natural History Museum, San Bernardino County Museum, Los Angeles County Museum of Natural History, Museum of Vertebrate Zoology, California Academy of Sciences, University of California at Los Angeles, and Long Beach State College.

Specimens essential for distributional records, but taken over too long a

period and too great an area for use in migration studies. Inequality of field effort at different seasons precludes use of data for seasonal analysis.

CALIFORNIA ACADEMY OF SCIENCES, San Francisco.

Holds one of the major research collections in the west. However, according to L.C. Binford, Curator of Birds (personal communication), there are few, if any unpublished field notes relevant to desert studies in the Academy.

LOS ANGELES COUNTY MUSEUM OF NATURAL HISTORY, Los Angeles, California

Dr. Ralph Schreiber, Curator of Birds, informs us (personal communication) that there are no unpublished data relevant to this study among the museum holdings.

MOORE LABORATORY OF ORNITHOLOGY, Occidental College, Los Angeles, California.

Dr. Luis Baptista (personal communication) reported that there are no unpublished materials dealing with the California deserts in the Laboratory.

MUSEUM OF VERTEBRATE ZOOLOGY, University of California, Berkeley.

Contains extensive file of field notes of the most prominent California ornithologists A.H. Miller, J. Grinnell, N.K. Johnson, their staff associates, and many students engaged in field work for the museum. We were unable to fully utilize these files, as none of the data are proprietary in nature. However, the MVZ staff has an admirable publishing record, and their notes on many areas have already been compiled and made available (e.g., Miller and Stebbins, 1964).

SAN DIEGO NATURAL HISTORY MUSEUM, San Diego, California.

Contains large research collections dealing with SW U.S. and Mexico. Important unpublished information includes field notes of L.M. Huey (extensive), Frank Stephens, and R.C. Banks.

SANTA BARBARA MUSEUM OF NATURAL HISTORY, Santa Barbara, California.

According to Dr. Dennis Power, Director, there are no extant field notes pertinent to the desert. All desert work by this museum was conducted prior to 1962 when the museum burned; all records and collections were lost.

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SAN BERNARDINO COUNTY MUSEUM, San Bernardino, California.

The personal field notes of E.A. Cardiff, Curator, contain extensive data on the E Mojave Region (area 5) and the Salton Sea. Much of the information on area 5 has been included in the report by Remsen (MS). Cardiff has also published the important notes from the Salton Sea area (see bibliography).

WESTERN FOUNDATION OF VERTEBRATE ZOOLOGY, Los Angeles, California.

According to the curator, Lloyd Kiff (personal communication), there are no field notes or other materials relevant to this study housed in this institution.

II Field Notes

BANKS, R.C. 1962. Unpublished field notes on the Bow Willow area of Borrego Desert, San Diego County, from 22 to 23 Sept. 1962.

On file at San Diego Natural History Museum. (see checklist)

BANKS, R.C. 1963-1964. Unpublished field notes on the Borrego desert area covering the periods Nov. 1963 - Feb 1964, March - July 1964.

On file at the San Diego Natural History Museum. (see checklist)

BANKS, R.C. 1965. Unpublished field notes from a trip to Grapevine Canyon, San Diego County on 31 Jan. 1965.

On file at San Diego Natural History Museum. (see checklist)

BANKS, R.C. 1965. Unpublished field notes for Pinyon Mt. Valley area, San Diego County, during 17-18 July 1965.

On file at San Diego Natural History Museum. (see checklist)

BANKS, R.C. 1966. Unpublished field notes at Bow Willow Canyon, San Diego County, on 5-6 March 1966.

On file at San Diego Natural History Museum. (see checklist)

GRINNELL, J. List of species, abundance of desert birds.

250 xeroxed pages from the files of MVZ, Berkeley. Provided by BLM staff.

Covers period 1908-1933. Mainly distributional records, of little value for migrational studies. Includes locality records of A.H. Miller for 1933.

HUEY, L.M. 1938. Unpublished list of birds from Bard, Imperial County, California, compiled ca. 1938.

Unpublished MS in files of San Diego Natural History Museum.

Based on over 20 years (1916-1936) of study. Contains list of 208 taxa with coded annotations on specimens (S) and location (San Diego Natural History Museum, Huey Collection, Dickey Collection); sight records (SR), and breeding records (BR). "In most cases a small series of specimens have been taken. The voluminous notes have not been transcribed as yet but they will only add data and not new names to list." (Additional notes from Bard area, through 1952, on file at San Diego Natural History Museum.) (see checklist)

HUEY, L.M. 1918. Unpublished field notes for Carrizo Creek, Vallecito Valley, La Puerta Valley and Mountain Springs, San Diego County, from 4-9 Jan.

On file at the San Diego Natural History Museum. (see checklist)

HUEY, L.M. 1921. Unpublished field notes for the area around Keeler and Olancho, Inyo County covering the period 26 Oct. - 19 Nov. 1921.

On file at San Diego Natural History Museum. (see checklist)

HUEY, L.M. 1922. Unpublished filed notes of the Panamint Mountain region with a description of the area covering the period 24 April - 2 May 1922.

On file at the San Diego Natural History Museum. (see checklist)

HUEY, L.M. Unpublished field notes on La Puerta Valley, San Diego County covering the period 11-14 Nov. 1922.

On file at the San Diego Natural History Museum. (see checklist)

HUEY, L.M. 1924. Unpublished field notes on the Borrego Valley, San Diego County with descriptions of the area from 23-28 May.

On file at the San Diego Natural History Museum. (see checklist)

HUEY, L.M. 1924. Unpublished field notes of area in eastern San Diego County and western Imperial County on 14 March 1924 with description of area.

On file at the San Diego Natural History Museum.

MCCASKIE, R.G. 1962-1977. Unpublished field notes, in author's possession.

This is the most extensive series of field notes on California birds. Data have been abstracted from desert regions and transcribed on checklists. A breakdown by region is given below.

MCCASKIE, G. 1970-1976. Unpublished field notes for Death Valley area including Scotty's Castle, Stovepipe Wells, Furnace Creek Ranch and Mesquite Springs covering the periods: Spring - 54 observations; Summer - 24 observations; Fall - 76 observations; Winter - 2 observations.

From G. McCaskie. (see checklists)

MCCASKIE, G. 1975-1977. Unpublished field notes made in Anza Borrego Desert covering the periods 16 March - 10 April (3 observations), and 22, 29 Jan.

From G. McCaskie. (see checklists)

MCCASKIE, G. 1974-1976. Unpublished field notes made at Clark Mountain, San Bernardino County, California covering the period 15-17 May (2 observations), 29 June - 28 Aug. (3 observations).

From G. McCaskie. (see checklists)

MCCASKIE, G. 1973-1975. Unpublished field notes made at Desert Center, Riverside County, California covering the periods 12 April - 11 May (4 observations), 1 Sept. 17 Nov. (7 observations).

From G. McCaskie. (see checklists)

MCCASKIE, G. 1962-1977. Unpublished field notes from Salton Sea area.

78 observations in spring, 92 in summer, 45 in fall and 57 in winter.

From G. McCaskie. (see checklists)

MCCASKIE, G. 1962-1973. Unpublished field notes from Morongo Valley/Yucca Valley

area covering the periods: Spring - 35 observations; Summer - 7 observations; Fall - 4 observations.

From McCaskie. (see checklists)

MCCASKIE, G. 1964-1976. Unpublished field notes for Deep Springs and Oasis covering the periods 20 May - 1 June (36 observations), 1 June - 31 Aug. (12 observations), 1 Sept. - 30 Nov. (16 observations).

From G. McCaskie. (see checklists)

MCCASKIE, G. 1967-1976 (minus 1969-1970). Unpublished field notes from Kelso/Cima area for the periods 21 April - 28 May (10 observations), 11 June - 20 Aug. (2 observations), 1 Sept. - 11 Nov. (8 observations).

From G. McCaskie. (see checklists).

MCCASKIE, G. 1968-1976. Unpublished field notes for Saratoga Springs, Indian Ranch (Panamint Valley), and Tecopa covering the periods: Spring - 12 observations; Summer - 4 observations; Fall - 9 observations.

From G. McCaskie. (see checklists)

MCCASKIE, G. 1968-1976 (omit 1968). Field notes made at Brock Ranch, Imperial County, California.

Covering the periods 7 Jan. - 17 Feb. (5 observations), 2 April - 31 May (8 observations), 20 June, 20 Oct. (see checklists)

MILLER, A.H. 1933. List of species of desert birds encountered.

Included with similar notes from Grinnell. About 250 Xerox pages. Provided by BLM staff from files of MVZ.

SAFFORD, V. and S.G. HARTER. 1931. Unpublished field notes on a trip through the Mojave desert in late Aug. 1931.

On file at San Diego Natural History Museum. (see checklist)

SAFFORD, V. and S.G. HARTER. 1931. Unpublished field notes from Junction Ranch, Argus Mts., Inyo County covering the period 7 Aug. - 17 Aug. 1931.

On file at San Diego Natural History Museum. (see checklist)

STEPHENS, F. 1902, 1903. Unpublished field notes.

On file in Department of Birds and Mammals, San Diego Natural History Museum, 1902. Trip from Whitewater Ranch (near Whitewater Station, lower end of San Gorgonia Pass) to Providence Mts., with description of road and habitat. Trip apparently made 24-25 May 1902. List of 31 species seen en route, including a few migrants. No data on movements. Providence Mts. 25 May - 7 June. List of about 40 species, with brief annotations. Includes some common migrants.

Mojave Valley, California and Arizona 10-18 June 1902. (Canyon below Needles to canyon above, area) Description of habitat, with animal life concentrated in the washes. 34 species seen, with brief information of broods, etc.

Colorado Valley 1-18 Aug. 1902. Precise locality unstated, names given include McFees, Ehrenbe, Cibolo. Many waterbirds, including gulls.

15 Jan. - 1 April 1903, made a trip between Tijuana and Colorado River. Reached Pilot Knob area about 21 Jan. and remained until 12 March. Notes are basis for his list of birds of Pilot Knob. (see checklist)

STEPHENS, F. 1924. Unpublished field notes for Pinon Mt., San Diego County, on 21 May 1924.

On file at San Diego Natural History Museum. (see checklist)

STEPHENS, F. 1924. Unpublished field notes for Warm Spring area, 4 1/2 mi E Vallicito, San Diego County on 19 April 1924.

On file at San Diego Natural History Museum. (see checklist)

STEPHENS, F. 1924. Unpublished field notes on the southern Colorado desert around Dixie, Seeley and Carrizo Creek covering the period of 17-26 Jan. with descriptions of the area.

On file at the San Diego Natural History Museum. (see checklist)

III Materials from BLM, Riverside

a. Breeding bird survey (by observer)

CARDIFF, S.W. 1977. Unpublished breeding bird survey for Mojave Yucca-Staghorn Cholla Desert Scrub. Landfair Valley.

Covering period of 24 April - 8 June. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

CARDIFF, S., E.A. CARDIFF and K.H. BERRY. 1977. Unpublished breeding bird survey for Tamarisk-Desert Riparian (Mojave River in Afton Canyon).

Covering period of 10 April - 28 April. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

CARDIFF, S., E.A. CARDIFF and K.H. BERRY. 1977. Unpublished breeding bird survey for Tamarisk-Quailbrush Marsh (Mojave River) Afton Canyon.

Covering period of 11 April - 6 June. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

CARDIFF, S.W. 1977. Unpublished breeding bird survey for Joshua Tree Woodland (2 mi N and 0.7 mi W of Cima).

Covering period of 17 April - 10 June. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

CARDIFF, S.W. 1977. Unpublished breeding bird survey for Pinyon-Juniper Woodland (Mid hills).

Covering period of 16 April - 9 June. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

DOCK, C. 1977. Unpublished breeding bird survey for Joshua Tree Woodland (Sand Canyon).

Covering period of 2 May - 28 May. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

DOCK, C. 1977. Unpublished breeding bird survey for Cheesebush-Golden Scrub

(Sand Canyon).

Covering period of 1-27 May. From the files of BLM, Riverside. Submitted to American Birds. (see checklist).

DOCK, C. 1977. Unpublished breeding bird survey for Rabbitbrush (Sand Canyon).

Covering period of 16-26 April. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

DOCK, C.. 1977. Unpublished breeding bird survey for Willow-Riparian, Desert Face of Sierra Nevadas-1 (Sand Canyon).

Covering period of 16-26 April. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

DOCK, C.F. 1977. Unpublished breeding bird survey of Digger Pine Parkland (Sand Canyon).

Covering period of 30 April - 27 May. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

FRANZREB, K. 1976. Unpublished breeding bird survey from Yuka area, southwestern desert, Imperial County.

Covering periods 14 April - 21 May and 29 Sept. - 8 Dec. 1976. From the files of BLM, Riverside. (see checklists)

FRANZREB, K. 1977. Unpublished breeding bird survey from eastern Imperial County.

Covering the period 13 Jan. - 16 June. From the files of the BLM, Riverside. (see checklist)

JEHL, J.R., Jr. 1977. Unpublished breeding bird survey for Mesquite Woodland (approximately 14.5 mi E of Calexico on State Hwy 98).

Covering period of 22 March - 1 June. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

JEHL, J.R., Jr. 1977. Unpublished breeding bird survey for Scrub Oak-Desert Chaparral (Smuggler's Cave).

Covering period of 3 April - 6 June. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

JEHL, J.R., Jr. 1977. Unpublished breeding bird survey for Creosote-Brittlebush, Rocky Hillside.

Covering the period of 3 April - 1 June. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

JEHL, J.R., Jr. 1977. Unpublished breeding bird survey for Ocotillo-Creosote Bush Scrub.

Covering the period of 22 March - 1 June. From the BLM, Riverside.
Submitted to American Birds. (see checklist)

LANDRY, R.E. 1977. Unpublished breeding bird survey for Saltbush Desert (Cuddback Lake).

Covering period of 27 April - 25 May. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

LANDRY, R.E. 1977. Unpublished breeding bird survey for Creosote-Golden Desert Scrub (Fremont Valley).

Covering the period of 26 April - 26 May. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

MCKERNAN, R.L. 1977. Unpublished breeding bird survey for N Mojave Sagebrush Scrub II. Salina Valley.

Covering the period of 12 April - 25 May. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist).

MCKERNAN, R.L. 1977. Unpublished breeding bird survey for N Mojave Sagebrush Scrub I, Saline Valley.

Covering period of 14 April - 24 May. From the files of BLM, Riverside.
Submitted to American Birds. (see checklist)

MCKERNAN, R.L. 1977. Unpublished breeding bird survey for Willow Riparian-Inyo Mountains, Willow Creek.

Covering the period of 6 April - 31 May. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

REMSEN, J. V. 1977. Unpublished breeding bird survey for the east Mojave area of San Bernardino County (New York Mts. and Kingston Mts.). Covering period 19 - 22 June. From files of BLM, Riverside. (see checklist)

WEINSTEIN, M. and K.H. BERRY. 1977. Unpublished breeding bird survey for Tamarisk-Saltbush (Afton Canyon).

Covering period of 12 April - 17 May. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

WEINSTEIN, M. and K.H. BERRY. 1977. Unpublished breeding bird survey for Mesquite-Saltbush (Afton Canyon).

Covering period of 11 April - 16 May. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

WEINSTEIN, M. and K.H. BERRY. 1977. Unpublished breeding bird survey for Desert Marsh (Afton Canyon).

Covering period of 10 April - 11 May. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

WOODMAN, P. 1977. Unpublished breeding bird survey for Northern Pinyon Pine Woodland, New York Butte.

Covering period of 8 June - 24 July. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

WOODMAN, P. 1977. Unpublished breeding bird survey for Limber Pine Forest, New York Butte.

Covering period of 7 June - 23 July. From the files of BLM, Riverside. Submitted to American Birds. (see checklist)

WOODMAN, P. 1977. Unpublished breeding bird survey for Willow Riparian,
Desert Face of Sierra Nevadas II, Grapevine Canyon.

Covering the period of 3 April - 5 June. From the files of BLM,
Riverside. Submitted to American Birds. (see checklist)

b. Raptor Surveys

RAPTOR SURVEYS, 1977. Miscellaneous data. From files of BLM, Riverside. About 23 xeroxed pages.

Distributional data on resident species, largely from May - June 1977, but with a few additional data from earlier years. From various parts of desert and non-desert areas. Data provide no indication of migration or movements.

ALTEN, G. 1977. Raptor survey, for Riverside, Imperial counties. From files of BLM, Riverside. About 11 xeroxed pages.

Covers period from early April - early June 1977. Distributional data, and nest records for resident species. No indications of migration or movements.

BALDRIDGE, F. 1977. Raptor survey in San Diego County. Unpublished data provided by BLM, Riverside.

Survey made in San Diego County (peripheral) in May - June 1977. Observations made during the breeding season and not relevant to migration. No evidence of migration can be inferred, or daily movements.

BOYCE, D. 1977. Raptor survey for Kern, Inyo, and Los Angeles County areas. Data from files of BLM, Riverside. About 14 xeroxed pages.

Distributional data for Mid-April - Late May 1977. Not useful for determining intra-desert movements or migration pathways.

SIPEREK, J. 1977. Raptor survey for San Bernardino County area. Data from files of BLM, Riverside. About 11 xeroxed pages.

Distributional data for period April - June 1977. Data do not suggest movements of resident species. Apparently small numbers of Cooper's Hawks pass through in late March - Mid-April, but data, as presented are not useful for analysis. Relevant data incorporated in area checklists.

THELANDER, C. 1977. Raptor surveys for Inyo, Kern and San Bernardino Counties. From files of BLM, Riverside. About 8 xeroxed pages.

Data from approximately 1 week in late April 1977, pertaining only to presumed resident species. No data on migration or movements.

c. Geothermal Project

GEOTHERMAL PROJECT. 1976. Unpublished bird census from the Yuha Area (Smoke Tree Wash, Coyote Wells, Plaster City) covering the periods 24 March - 21 May (24 observations) and 29 Sept. - 8 Dec. (7 observations), made by BLM staff. About 31 xeroxed pages.

From the office of BLM, Riverside. (see checklists)

GEOTHERMAL PROJECT. 1977. Unpublished bird censuses from the East Mesa area. (Glamis, Ogilby, Acolita, and Holtville) covering the periods 19 April - 26 May (61 observations) and 1-23 June (11 observations) made by BLM staff. About 60 xeroxed pages.

From the office of BLM, Riverside. (see checklists)

d. Salton Sea Project

SALTON SEA PROJECT. 1976-1977. Unpublished bird censuses for the Salton Sea area covering the periods 31 March - 28 May 1976 (30 observations), 30 Sept. - 5 Nov. 1976 (30 observations), 28 Dec. - 30 Dec. (8 observations), and 6-7 April 1977 (3 observations). Made by BLM staff. About 60 xeroxed pages.

From the office of BLM, Riverside. (see checklists)

e. Sun Desert Project

SUN DESERT PROJECT. 1976-1977. Unpublished species list from the office of BLM, Riverside containing approximately 300 xeroxed pages (not used).

See also Locality Data Sheets for the same project.

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Acolita Quad (Algodones Dunes), covering the periods 13 May, 14, 19 July, and 4 Sept. - 10 Nov. (8 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Borrego Quad (Peña Spring, Culp Valley), covering the periods 23 June - 16 Aug. (5 observations) and 9 Sept. - 7 Nov. (6 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for Brawley covering the period 15 April - 26 May (2 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklist).

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Calexico Quad, covering the periods 16 April - 23 April (5 observations); and 16 July - 13 Aug. (3 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976-1977. Unpublished bird censuses for the Calipatria Quad, Salton Sea area (including Finney/Ramer Lakes) covering the periods 11 May - 28 May (5 observations), 18 June, 6 Oct., 30 Jan. 1977 (2 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Carrizo Mountain Quad (Mountain Palm Springs), on 14 April and 10 June, made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird census for Cathedral City on 19 May, made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976, 1977. Unpublished bird censuses for the Chuckwalla Mountain Quad covering the periods 7 April - 19 May (10 observations), 30 July (2 observations), 17 Sept., 21 Oct., 15 Jan. 1977 (2 observations) and 29 March, made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird censuses data for the Chuckwalla

Spring Quad covering the period 28-29 April (5 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses data for the Coachella Quad (Painted Canyon) on 14 May, made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976, 1977. Unpublished bird censuses for the Coyote Wells Quad (including Inkopah Gorge, Davies Canyon and Valley and Crucifixion Thorn area) on 10 Feb. 1976, 21 April 1976, 14 Oct. 1976 and 20 March 1977, made by the BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Glamis Quad on 11 and 13 May, made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Coxcomb Mountain Quad (Desert Center) covering the periods 27 July - 19 Aug. (2 observations), 4 Sept. - 10 Nov. (9 observations), made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird censused for the Cottonwood Springs Quad (Mecca Hills and Dos Palmas Springs) covering the periods 14-19 May (2 observations), 4 June - 4 Aug. (6 observations), 19 Sept. - 7 Nov. (8 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Heber Quad (New River area) on 23 April and 27 May, made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Hayfield Quad (Salt Creek) on 7 April - 19 May (8 observations) and 3 June - 17 Aug. (5 obser-

vations), made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976, 1977. Unpublished bird censuses for the Iris Pass Quad covering the periods 7-21 March 1977, 29 July 1976 and 21 Oct.- 5 Nov. 1976 (2 observations), made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Jacumba Quad covering the periods 11-12 Feb., 21 April (2 observations), 8 June - 12 Aug. (6 observations), 14 Oct. - 23 Oct. (5 observations), made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Holtville Quad on 23 April and 11 May, made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976, 1977. Unpublished bird censuses for the McCoy Springs Quad (Chuckwalla Sand Dunes and Ford Dry Lake) for the periods 8, 19 March 1977, 20-21 May (3 observations), 15 June - 6 Aug. (6 observations), 4 Sept. - 5 Nov. (15 observations), 12 Dec. - 7 Jan. (2 observations), made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Midland Quad (Big Maria Mountains) on 5 Oct. made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for Midway Well Quad (Calexico, Brock Ranch and the All American Canal) covering the periods 22 July - 13 Aug. (4 observations), 4 Sept. - 10 Nov. (15 observations) and 23 Dec., made by BLM staff.

From the office of BLM, Riverside. (see checklists)

SUN DESERT PROJECT. 1976, 1977. Unpublished bird censuses for Morongo Valley (Big Morongo Canyon) covering the periods 13-21 March 1977 (2 observations),

3 April - 15 May 1976 (2 observations), 5 June and 30 Oct. 1976, made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1977. Unpublished bird censuses for the Niland, Salton Sea area on 30 Jan., made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976, 1977. Unpublished bird censuses for the Ogilby Quad covering the periods 6 March 1977, 16 April - 20 May 1976 (5 observations), 16 June - 5 Aug. 1976 (5 observations), 5 Sept. - 10 Nov. 1976 (7 observations) made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Palen Mountains on 9 Sept., made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Palm Springs Quad covering the periods 6 July - 8 July (3 observations) and 22 Oct., made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Quartz Peak Quad covering the periods 15 May, 15 June - 5 Aug. (2 observations), 4-12 Nov. (3 observations), made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for the Rice Quad (Colorado River Aqueduct) on 14 Sept., made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976, 1977. Unpublished bird censuses for the Palo Verde Mountains Quad (Milpitas Wash) covering the periods 7, 19 March 1977, 17 April - 21 May 1976 (3 observations), 21 July - 10 Aug. 1976 (3 observations), 4 Sept. -

10 Nov. 1976 (9 observations) and 6 Jan. 1977, made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for Ripley Quad on 5 Aug. made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for Sidewinder Well Quad covering the periods 27 April (3 observations), 29 July, 8 Sept. - 17 Sept. (3 observations), made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses for Thousand Palms Quad covering the periods 4 April - 11 June (4 observations), 9 July and 3 Aug. made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished birds censuses data for Whipple Mountain Quad on 14-15 Sept. made by BLM staff.

From the office of BLM, Riverside. (see checklist)

SUN DESERT PROJECT. 1976. Unpublished bird censuses data for Wister Fish Hatchery (man-made reservoir) on 4 Dec. made by BLM staff.

From the office of BLM, Riverside. (see checklist)

f. Sun Desert Nuclear Project

SUN DESERT NUCLEAR PROJECT. 1977. Unpublished bird censuses for the Iris Pass Quad (Chuckwalla Bench Wash) for the period 7 March - 4 June (9 observations), made by BLM staff. About 6 xeroxed pages.

From the office of BLM, Riverside. (see checklist)

SUN DESERT NUCLEAR PROJECT. 1977. Unpublished bird censuses for the McCoy Springs Quad (Chuckwalla Dunes) for the period 8 March - 2 June (10 observations) made by BLM staff. About 10 xeroxed pages.

From the office of BLM, Riverside. (see checklist)

SUN DESERT NUCLEAR PROJECT. 1977. Unpublished bird censuses for the Ogilby Quad (Indian Wash) covering the period 6 March - 7 June (10 observations) made by BLM staff. About 9 xeroxed pages.

From the office of BLM, Riverside. (see checklist)

SUN DESERT NUCLEAR PROJECT. 1977. Unpublished bird censuses for the Palo Verde Mountain Quad (Milpitas Wash) for the period 6 March - 6 June (11 observations) made by BLM staff. About 10 xeroxed pages.

From the office of BLM, Riverside. (see checklist)

g. Wildlife Project

WILDLIFE PROJECT. 1976. Unpublished bird censuses for the Palm Desert, Martinez Canyon area on 6 July made by BLM staff. Two xeroxed pages.

From the office of the BLM, Riverside. (see checklist)

h. Rail Survey

HENDERSON, P. 1977. Unpublished Rail survey for Saline Valley, Amargosa Gorge, Fort Piute Harper Lake, San Sebastian Marsh, Afton Canyon and China Lake during May and June. Approximately 90 xeroxed pages.

From the office of BLM, Riverside. (see checklist)

1. Miscellaneous

BUREAU OF LAND MANAGEMENT, RIVERSIDE, CALIFORNIA. 1977. Bird transect data from various habitats in Iron Mountain, Cadiz Valley quadrangles. 45 xeroxed pages.

Includes distributional data from control and experimental sites. Data are not suited for analysis of movements. They include the following:

Iron Mountain Quadrangle (TIS, R19E, Sec. 7)

<u>Habitat</u>	<u>Dates</u>	<u>Number of Observations</u>
Vegetated Sand (test)	16 March-4 May	5
Vegetated Sand (control)	16 March-4 May	5
Atriplex	3 March-24 April	8
Desert Wash (test)	28 March-2 May	5
Desert Wash (control)	28 March-4 April	2
Smoke Tree Wash (control)	4 April-2 May	3
Rockland (test)	30 March-25 April	4
Rockland (control)	30 March-4 April	4

Cadiz Valley Quadrangle (TIS, R15E, Sec. 12+1)

Creosote Flat (test)	14 March-5 May	6
Creosote Flat (control)	14 March-5 May	6

GREEN, N.F. 1977. Unpublished S. C. O. R. E. bird observations. From the files of BLM, Riverside. About 26 xeroxed pages.

Bird observations made at mammal trap sites in California/Arizona deserts, 30 March - 30 June 1977.

Avian distribution analyzed by habitat type (table). Data not presented by date of observations, and therefore of little use for migrational studies. Include xerox of note to K. Berry reporting a pair of *Pyrrhuloxias* in Chemehuevi Wash, 17.1 mi N, 4 mi W Vidal Junction, southern San Bernardino County. Birds in area since 6 June, and obviously territorial (responded to tape recording). No definite evidence of nesting.

WILDLIFE OBSERVATION REPORTS. 1977. Unpublished 41 pages of xerox copy provided by BLM (including all vertebrates). From a series of individual cards (1 per species), apparently all made in spring 1977. Of no value to this study.

AXELSON, K. Unpub. field notes 1964-1977. Deals with northwestern Mojave Regions, including Jawbone Canyon, Kelso Valley, Piute Mts., Butterbread Springs, Horse Canyon. Early years are mainly lists of species; numbers included for 1975-present. 54 xerox p. Data from many season. Provided by K. Axelson to BLM, Riverside.

Dow, J. Field notes, 1970-1973, from China Lake Area. Data tabulated by month, including dates of observation. Observations at sewage ponds, China Lake Naval Weapons Center. 2 pp. xerox. Provided by BLM, Riverside.

Moore, D. W., W. R. Fish and J. Dow. 1973. Check-list of birds on the Indian Wells Valley area. Mimeo, copyrighted. Deals with Indian Wells valley and adjacent canyons; limited to Lower Sonoran zone. Status of all species recorded. 8 p. mimeo. Provided by BLM, Riverside.

Tarble, J. Unpub. Notes on the birds of the Anargosa Gorge, Tecopa, and China Ranch areas. Year-round data, accumulated with the assistance of Shirley Wells. Not seen. In possession of Ms. Tarble.

J. East Mojave Survey

REMSEN, J. V. Birds of the East Mojave Desert. Unpublished manuscript provided by BLM, Riverside. About 125 xeroxed pages.

Detailed annotated checklist summarizing distribution, periods of abundance of all species in E Mojave (N.B. geographic limits of this area corresponds to Area 5 of present report). Exceptionally detailed and complete; very useful.

k. Fish and Wildlife Breeding Bird Survey

FISH AND WILDLIFE SERVICE BREEDING BIRD SURVEYS. 1965-1976. Unpublished strip-censuses, on computer printout. Extensive. Provided by BLM, Riverside

Censuses are for the following areas in our study:

Area 2: 83/29, 83/30, 83/58, 83/124, 83/139.

Area 3: 83/40, 83/59.

Area 4: 83/36, 83/41, 83/60, 83/61, 83/85, 83/94.

Area 5: 83/37, 83/109.

Area 6: 83/88, 83/131.

Area 7: 82/90.

Area 8: 82/48, 82/51, 82/70, 82/89, 82/92, 82/150.

Data from all censuses plotted on maps and regional checklists.

IV. Checklists by Areas

Checklists for each area, derived from the above-referenced material are not separately indexed, but are included as Supporting Material.

Appendix

CARDIFF, E.A. See San Bernardino County Museum.

DICKEY, D.R. 1916. Unpublished field notes from the Bard region of Imperial County for the period of 20 April - 24 May. On file at the San Diego Natural History Museum.

JOHNSON, N.K. Johnson is Curator of Birds at the Museum of Vertebrate Zoology. He has compiled extensive data on the Clark Mountains and other desert areas that are currently being prepared for publication.

MUSEUM OF VERTEBRATE ZOOLOGY. Unpublished field notes of various workers. Provided by BLM, Riverside. (Data received 30 November 1977). List of species found in desert regions. Approximately 300 xeroxed pages.

Mainly distributional records, of little value for migration studies. Includes records of E.C. Aldrich, D. Arvey, R.E. Bailey, H.C. Bryant, C.L. Camp, J.E. Chaltin, G. Christman, P. DeBenedictis, Dixon, H. Fisher, Hall, J. Hendrickson, M. Hildebrand, Hunt, D.H. Johnson, A.S. Leopold, J. Linsdale, J. Marshall, A.H. Miller, R.J. Raitt, C. Richardson, W.C. Russell, G.W. Salt, C. Silbley, T. Storer, H.S. Swarth, F.W. Taber, and H.G. Weston.

PART C

Published material dealing with adjacent areas

ANDERSON, A.H. 1972. A bibliography of Arizona ornithology. University of Arizona Press, Tucson. 241 pp.

ARNOLD, L.W. 1942. Water birds influenced by irrigation projects in the Lower Colorado River Valley. Condor 44: 183-184.

Study in the Yuma area during the winter and spring of 1940-1941 with regard to the increase in bird species which are dependent on water, due to irrigation in area. (see checklist)

AUSTIN, G.T. 1970. Breeding birds of desert riparian habitat in southern Nevada. Condor 72: 431-436.

Densities of species and estimates of diversity.

AUSTIN, G.T. 1970. The occurrence and status of certain anatids in southern Nevada. Condor 72: 474.

Largely concerns rarities. Of interest as peripheral area. Snow Goose fairly common as a transient, which may apply to Salton Sea winterers.

BOND, R.M. The Peregrine population of western North America. Condor 48: 101-116.

Discusses habitat and breeding distribution with maps. Birds are almost always found near some water. Species lacking in desert because of aridity and heat. Two nests have been found along the Lower Colorado River in California.

BROOKS, A. 1913. Unusual records for California. Condor 15: 182.

Anhinga seen, but not collected, at Potholes 9 Feb. 1913 (In Colorado River).

BROWN, H. 1904. The Elf Owl in California. Condor 6: 45-47.

Nests and eggs in saguaro on 17 May at Duncan Flats, near Colorado River. Also nesting were: Gilded Flicker, Screech Owl (4 young), and Gila Woodpecker.

BRYANT, H.C. 1941. A Nighthawk migration on an Arizona desert. Condor 43: 293.
Large numbers of Common Nighthawks seen near Grand Canyon on 29 July 1941.

BRYANT, H.C. and A.M. BRYANT. 1945. Another Nighthawk migration on an Arizona desert. Condor 47: 268.

Flight much larger than that recorded in 1941; on 17 Aug. 1943 in same general area.

CARDIFF, E.A. 1963. Solitary Vireo of the race plumbeus in California. Condor 65: 534.

Collected on 26 Nov. 1960, 4 mi N of Needles, San Bernardino County.

DICKEY, D.R. 1922. The Arizona Crested Flycatcher as a bird of California. Condor 24: 134.

Two collected 17 May 1921 near Bard, in Colorado River Valley.

DICKEY, D.R. 1922. A second capture of the Broad-tailed Hummingbird in California. Condor 24: 135.

One immature male taken on Cottonwood Creek, 9000 ft. altitude, in White Mts.

DICKEY, D.R. 1923. Description of a new Clapper Rail from the Colorado River Valley. Auk 40: 90-94.

Rallus longirostris yumanensis described from specimens taken at Bard on 15 May 1921.

DICKEY, D.R. and A.J. VAN ROSSEM. 1922. The Gray Flycatcher in the White Mountains in California. Condor 24: 137.

Four specimens reported: 2 at McCloud Camp, Mono County, 10,000 ft., 27 Aug. 1921; 2 at Wyman Creek Canyon, Inyo County, 8000 ft., 3, 4 Sept. 1921. All juveniles, implies local breeding.

FRIEDMANN, H.; L. GRISCOM and R.T. MOORE. 1950. Distributional checklist of the birds of Mexico. Part I. Pacific Coast Avifauna #29.

Distribution, taxonomy. Of interest for ranges of migrants wintering in Mexico.

GARDNER, L.L. 1959. Gila Woodpecker in San Diego County, California. Condor 61: 435.

Reported near Jacumba on 17 Oct. 1953, questionable.

GRINNELL, J. 1914. An account of the mammals and birds of the Lower Colorado Valley with especial reference to the distributional problems presented. U. California Publ. Zool. 12: 51-294.

Detailed study along the Colorado River from Needles S to Yuma. Includes list of animals by plant associations. Discusses the river as a highway and hindrance to dispersal and the general problems of barriers with regard to animals.

GRINNELL, J. 1928. A distributional summation of the ornithology of Lower California. U. California Publ. Zool. 32: 1-300.

The definitive book on birds of Baja California. Mainly distributional but important because of the large numbers of migrants that winter in the S part of the peninsula and pass through the deserts in migration.

GRINNELL, J. and H.S. SWARTH. 1913. An account of the birds and mammals of the San Jacinto area of Southern California. U. California Publ. Zool. 10: 197-416

Deals primarily with mts. but includes data on contiguous desert areas; field work mostly done in 1908. No important data on migration.

GULLION, G.W. 1956. Evidence of double-brooding in Gambel Quail. Condor 58: 232-234.

Observations made at Granite Spring, 12 mi S of Davis Dam, Nevada.

GULLION, G.W. and G.C. CHRISTENSEN. 1957. A review of the distribution of gallinaceous game birds in Nevada. Condor 59: 128-138.

Includes range maps of 9 species, some from along the Colorado River.

GULLION, G.W., W.M. PULICH and F.G. EVENDEN. 1959. Notes on the occurrence of birds in southern Nevada. Condor 61: 278-297.

An annotated checklist of birds from southern Nevada including the area along the Colorado River N along the California boundary.

HENSLEY, M.M. 1954. Ecological relations of the breeding bird population of the desert biome of Arizona. Ecol. Monogr. 24: 185-207.

Observations on breeding and habitat utilization by breeding and migrant species in Organ Pipe Cactus National Monument. Reports seasonal occurrence of both breeding and migrant species, habitat utilization by both groups, and population densities and breeding success of breeders.

No information on migration or dispersal other than tabulation of dates observed.

HUEY, L.M. 1920. Two birds new to the Lower Colorado River region. Condor 22: 73.

Hooded Merganser 26 Nov. 1916; Curve-billed Thrasher 31 Dec. 1916, both near Bard.

HUEY, L.M. 1926. Two species new to the avifauna of California. Condor 28: 44.

Junco (hyemalis) mearnsi taken 1 mi N of Potholes, 24 Oct. 1924; one taken at Huey ranch "within 4 miles" of Potholes 15 Jan. 1925.

Cape May Warbler collected at Laguna Dam 23 Sept. 1924.

HUEY, L.M. 1959. The second occurrence of a Brown Booby near Parker Dam on the Colorado River. Condor 61: 223-224.

Collected on 20 Nov. 1957 at Headgate Rock Dam on the California side of the river.

HUEY, L.M. 1960. Notes on Vaux and Chimney Swifts. Condor 62: 483.

Reports on the presence of the Vaux swift in the San Diego area. Chimney swift collected on 6 May 1930 near Potholes, Imperial County.

JOHNSON, N.K. 1956. Recent bird records for Nevada. Condor 58: 449-452.

Includes records from the Colorado River area.

100
JOHNSON, N.K. 1965. The breeding avifaunas of the Sheep and Spring ranges in southern Nevada. Condor 67: 93-124.

Important paper, particularly because of proximity of these mts. to Clark Mt., California. Good data on habitat. "Migrating birds returning to boreal breeding areas often cross lowland deserts during the spring when these deserts may be relatively cool and otherwise hospitable. In other words the deserts may not serve as effectively as barriers, during the seasons of active dispersal, as would water masses surrounding islands. Even relatively sedentary montane species may cross deserts during cooler seasons. Gullion et al. (1959) cite records of the Pygmy Nuthatch in the McCullough Range, S Clark County, Nevada for March." p 120-121. (Gullion et al. give one record: evidence of dispersal only, not migration.)

JONES, H.L. 1971. Olivaceous Cormorant record for California. California Birds 2: 134.

One seen 13 April 1971, Imperial Dam. First California record,

KIMBALL, H.H. 1922. Bird records from California, Arizona and Guadalupe Island. Condor 24: 96-97.

Elf Owl: 2 or 3 seen at Bard, April 1915. Lewis Woodpecker: "several" at Bard, 30 April 1915.

LEACH, H.R. and A.L. HENSLEY. 1954. The Sage Grouse in California with special reference to food habits. California Fish and Game 40: 385-394.

Distribution map shows range extending into Inyo County at Big Pine, Owens Valley. Occurs in semiarid sagebrush.

MCMURRY, F.B. 1947. Least Grebe breeding in California. Condor 49: 125-126.

Adult and young birds collected at Imperial Dam on 23 Oct. 1946.

MELLOR, N.H. 1955. Inca Dove and Ground Dove recorded at Corona, Riverside County, California. Condor 57: 191.

Refers to Inca Dove record at Parker Dam, California side of Colorado River.

MILLER, A.H. 1945. Birds of the yellow pine association of Potosi Mountain,

southern Nevada. Condor 47: 130-131.

Compares habitat of the area with Clark Mt.; discusses various birds found in each.

MILLER, A.H. and W.C. RUSSELL. 1956. Distributional data on the birds of the White Mountains of California and Nevada. Condor 58: 75-77.

Reports specimens collected in White Mts. (see checklist)

MILLER, A.H., H. FRIEDMANN, L. GRISCOM and R.T. MOORE. 1957. Distributional checklist of the birds of Mexico. Part II. Pacific Coast Avifauna, #33.

Distribution, taxonomy. Of interest for ranges of migrants wintering in Mexico.

MILLER, L.(H.) 1925. Food of the Harris Hawk. Condor 27: 71-72.

"At least five" observed at Potholes, last week of Dec. 1924.

MONSON, G. 1944. Notes on birds of the Yuma region. Condor 46: 19-22.

Annotated list of observations made from 1 July 1942 through 30 June 1943.

MONSON, G. 1946. Brewster's Booby in Arizona. Auk 63: 96.

One Brown Booby photographed on Havasu Lake, Colorado River, Arizona.

MONSON, G. 1949. Recent notes from the Lower Colorado River Valley of Arizona and California. Condor 51: 262-265.

Annotated list of 55 species noted along the Colorado River May 1943 - Feb. 1944 and April 1946 - Nov. 1949.

MONSON, G. 1958. Reddish Egret and Bronzed Cowbird in California. Condor 60: 191.

Reddish Egret taken on 9 Sept. 1954 at Lake Havasu on the Colorado River. Two Bronzed Cowbirds seen near Bard 30 April 1955, one collected 12 May 1955.

PULICH, W.M. 1950. Second record of the Ross Goose from Arizona. Condor 52: 90.

One collected 10 Dec. 1948 at Lake Havasu.

SMITH, A.P. 1919. Notes from Inyo County, California. Condor 21: 213-214.

At Lone Pine in Owens Valley, March 1919. Brown Towhee: 1 collected of 2 seen together, 22 March. Sage Sparrow: 1 collected 21 March, fairly common after this date. Long-billed Marsh Wren, Bewick's Wren: both fairly common. Ring-necked Pheasant: abundant.

STAGER, K.E. 1965. An exposed nocturnal roost of migrant Vaux Swifts. Condor 67: 81-82.

Large cluster of swifts roosting on the exposed surface of a tree trunk on 8 May 1964, 2 mi S of Davis Dam, Arizona.

VAN ROSSEM, A.J. 1946. An isolated colony of the Arizona Cardinal in Arizona and California. Condor 48: 247-248.

Pair 1946 on the California side of the Colorado River below Parker Dam. 7 May 1946, 5 mi S of Earp, San Bernardino County.

VAN ROSSEM, A.J. 1947. The distribution of the Yuma Horned Lark in Arizona. Condor 49: 38-40.

Found along the Lower Colorado River Valley; range map shows it in California above Laguna Dam.

WILLIAMSON, F. 1958. Data on relative heart size of the Warbling Vireo and other passerines from high altitudes. Wilson Bull. 70: 90-91.

Lists 24 species taken during the breeding season in the White Mts. of California and Nevada.

ZIMMERMAN, D.A. 1973. Range expansion of Anna's Hummingbird. American Birds 27: 827-835.

Discusses increase in the non-breeding range and establishment of new breeding population in areas of the western United States and northern Mexico, east of California.

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